

**Special Publication No. 04-10**

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# **Review of the 2004 Lower Cook Inlet Area Commercial Salmon Fishery, Personal Use Coho Salmon Gillnet Fishery, And Salmon Enhancement Programs**

**by**

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**November 2004**

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**Alaska Department of Fish and Game**

**Divisions of Commercial Fisheries and Sport Fish**



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Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative Code		fork length	FL
deciliter	dL		AAC	mideye-to-fork	MEF
gram	g	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	mideye-to-tail-fork	METF
hectare	ha			standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	<b>Mathematics, statistics</b>	
meter	m			<i>all standard mathematical signs, symbols and abbreviations</i>	
milliliter	mL	at	@		
millimeter	mm	compass directions:			
		east	E	alternate hypothesis	H <sub>A</sub>
<b>Weights and measures (English)</b>		north	N	base of natural logarithm	<i>e</i>
cubic feet per second	ft³/s	south	S	catch per unit effort	CPUE
foot	ft	west	W	coefficient of variation	CV
gallon	gal	copyright	©	common test statistics	(F, t, $\chi^2$ , etc.)
inch	in	corporate suffixes:		confidence interval	CI
mile	mi	Company	Co.	correlation coefficient (multiple)	R
nautical mile	nmi	Corporation	Corp.		
ounce	oz	Incorporated	Inc.	correlation coefficient (simple)	r
pound	lb	Limited	Ltd.		
quart	qt	District of Columbia	D.C.	covariance	cov
yard	yd	et alii (and others)	et al.	degree (angular )	°
		et cetera (and so forth)	etc.	degrees of freedom	df
<b>Time and temperature</b>		exempli gratia		expected value	<i>E</i>
day	d	(for example)	e.g.	greater than	>
degrees Celsius	°C	Federal Information Code	FIC	greater than or equal to	≥
degrees Fahrenheit	°F			harvest per unit effort	HPUE
degrees kelvin	K	id est (that is)	i.e.	less than	<
hour	h	latitude or longitude	lat. or long.	less than or equal to	≤
minute	min	monetary symbols		logarithm (natural)	ln
second	s	(U.S.)	\$, ¢	logarithm (base 10)	log
		months (tables and figures): first three letters	Jan,...,Dec	logarithm (specify base)	log <sub>2</sub> , etc.
<b>Physics and chemistry</b>				minute (angular)	'
all atomic symbols				not significant	NS
alternating current	AC	registered trademark	®	null hypothesis	H <sub>0</sub>
ampere	A	trademark	™	percent	%
calorie	cal	United States		probability	P
direct current	DC	(adjective)	U.S.	probability of a type I error	
hertz	Hz	United States of America (noun)	USA	(rejection of the null hypothesis when true)	α
horsepower	hp				
hydrogen ion activity (negative log of)	pH	U.S.C.	United States Code	probability of a type II error (acceptance of the null hypothesis when false)	
parts per million	ppm	U.S. state	use two-letter abbreviations		β
parts per thousand	ppt, ‰		(e.g., AK, WA)	second (angular)	"
				standard deviation	SD
volts	V			standard error	SE
watts	W			variance	
				population sample	Var var

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SALMON FISHERY, PERSONAL USE COHO SALMON GILLNET  
FISHERY, AND SALMON ENHANCEMENT PROGRAMS**

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November 2004

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*This document should be cited as:*

*Hammarstrom, L.F., and M.S. Dickson. 2004. Review of the 2004 Lower Cook Inlet Area Commercial Salmon Fishery, Personal Use Coho Salmon Gillnet Fishery, and Salmon Enhancement Programs. Alaska Department of Fish and Game, Special Publication No. 04-10, Anchorage.*

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## **ABSTRACT**

The 2004 Lower Cook Inlet commercial salmon fishery was characterized by lower than average sockeye harvests and higher than average pink and chum harvests. The all-species harvest totaled approximately 2.867 million fish, dominated by pink salmon at 88% and chum salmon at 7%. The exvessel value was approximately \$1.26 million, the second lowest over the past decade. Participation remained at low levels for the only two allowable gear groups, purse seine and set gillnet, and was similar to the previous three seasons. Salmon enhancement continued to play a key role in commercial harvests due to numerous sockeye salmon lake stocking projects and two different pink salmon hatcheries. The harvest of salmon for cost recovery purposes by hatchery facilities once again comprised a significant portion of the overall Lower Cook Inlet commercial catches, estimated at approximately 87% in numbers of fish and 31% in exvessel value. The Southern District Personal Use Coho Salmon Fishery in Kachemak Bay produced a harvest of an estimated 1,550 coho salmon, falling at the mid-point of the guideline harvest range of 1,000 to 2,000 coho salmon. Participation in the fishery, at 64 permits actively fished, was the lowest level since 1974.

Key words: Lower Cook Inlet, commercial salmon harvest, salmon enhancement, hatchery, cost recovery, personal use fishery, purse seine, set gillnet, escapement.

## **INTRODUCTION**

The Lower Cook Inlet (LCI) salmon management area is bounded on the north by the latitude of Anchor Point, on the south by the latitude of Cape Douglas, and on the east by the longitude of Cape Fairfield (Figure 1). The area is divided up into five districts: Southern, Kamishak Bay, Barren Islands, Outer, and Eastern. Commercial salmon fishing occurs in all but the Barren Islands District. Purse seining and set gillnetting are the only allowable gear types. Approximately 85 seine permits are issued for LCI, but the areas where set gillnetting can occur (Figure 2) is extremely limited, and an average of only 22 set gillnet permits have annually participated in that fishery over the past decade.

Pink salmon have historically provided the bulk of the commercial salmon harvests in LCI, while sockeye salmon have provided the greatest exvessel value due to a variety of lake stocking enhancement projects throughout the management area. Enhancement continues to play a dominant role in both sockeye and pink salmon production in LCI.

## **2004 LOWER COOK INLET COMMERCIAL SALMON SEASON OVERVIEW**

The 2004 Lower Cook Inlet salmon harvest of 2.87 million fish was the third highest during the last two decades, easily exceeding the most recent 10- and 20-year averages (Tables 1 and 2). The catch yielded an exvessel value of approximately \$1.26 million, representing less than two-thirds of the average annual value over the previous 10 years (Tables 3 and 4) and the second lowest figure during that time.

The overall harvest nearly achieved the preseason forecast, and the following table compares the actual catch by species to the preseason forecast and the long-term average:

SPECIES	'04 PROJECTED HARVEST	'04 ACTUAL HARVEST <sup>a</sup>	1984-2003 AVERAGE
Chinook	1,300 <sup>b</sup>	1,632	1,404
Sockeye	162,500	130,121	283,479
Coho	13,700 <sup>b</sup>	11,221	12,212
Pink	2,991,000	2,517,564	1,174,242
Chum	23,600 <sup>c</sup>	206,683	51,919
<b>TOTAL</b>	<b>3,192,100</b>	<b>2,867,221</b>	<b>1,523,256</b>

<sup>a</sup> Preliminary data, which includes common property and hatchery cost recovery harvests and sport derby sales.

<sup>b</sup> Commercial harvest forecasts of Chinook and coho salmon represent average harvests since 1980 and are comprised of a combination of naturally-produced fish as well as fish produced from enhancement programs in LCI; no attempt is made to separate the two components.

<sup>c</sup> Forecasts for chum salmon are simply average annual commercial harvests since 1989.

Once again, LCI commercial salmon harvests relied heavily on the success of hatchery and enhanced fish production. Pink salmon production from Tutka Hatchery, operated by Cook Inlet Aquaculture Association (CIAA), surpassed expectations, and the harvest of this species returning to the facility comprised over 40% of the all-species catch. The overall return of pinks to Tutka Hatchery, estimated at about 1.2 million fish, was the highest for the facility since 1999. Another pink salmon hatchery, located in Port Graham of the Southern District, also experienced a better than expected return, with a harvest totaling nearly 1.3 million fish. In the case of both hatcheries, however, the respective returns in excess of broodstock and/or escapement requirements were utilized entirely for hatchery cost recovery.

Over half of the LCI sockeye salmon harvest in numbers of fish, and two-thirds of the sockeye exvessel value, was attributed to CIAA and Port Graham Hatchery Corporation (PGHC) lake stocking and fertilization projects at Leisure, Hazel, and English Bay Lakes in the Southern District, Kirschner Lake in the Kamishak Bay District, and Bear Lake in the Eastern District. The enhancement/rehabilitation project at English Bay Lakes, undertaken by Chugach Regional Resources Commission (CRRC) and PGHC, experienced a slightly stronger than anticipated return that achieved the escapement requirements while still providing a targeted harvest for the local subsistence fishery and a limited commercial set gillnet harvest in Port Graham Subdistrict.

As has been the case since hatchery programs were taken over by private non-profit agencies in LCI, a significant portion of the salmon harvest was utilized to recoup expenses incurred by the hatchery facilities and the various stocking and enhancement projects throughout the management area. Approximately 87% of the total salmon harvest was taken as cost recovery by CIAA and PGHC (Table 4) to support the sockeye lake stocking programs and Tutka and Port Graham Hatchery operations, equating to almost one-third of the exvessel value of the LCI salmon fishery.



The absence of regular tender service in remote districts, a notable factor that has affected the amount and distribution of seine effort, and ensuing harvest of salmon, in LCI over the past decade, once again influenced overall harvests during 2004. The policy to severely restrict or eliminate such remote tender service was adopted in 1994 by major processors as a means to reduce costs. Prior to that time, processors routinely stationed a tender (or tenders) in remote districts in anticipation of salmon harvests, even when run strengths and catches were marginal. Once that policy was abandoned, however, seiners were forced to devise their own means to transport fish from these remote areas to a processing plant in Homer or elsewhere. Due to equipment limitations and the high cost of contracting out for tendering services, significant numbers of fishermen were often unable to fish in remote areas, while some retained the flexibility to fish these traditional areas because of onboard chilling equipment. Despite erratic tender service in 2004, strong chum salmon returns induced active directed fishing effort, resulting in the highest harvest of that species since 1988. Additionally, prices for salmon rebounded to higher levels for all species except pinks, the price for which fell yet again to an all-time record low. Nonetheless, the overall trend of worldwide salmon markets and the salmon industry in Alaska continued to affect commercial fishing in LCI, contributing to low levels of overall effort.

## **SUMMARY BY SPECIES**

### **CHINOOK SALMON**

The 2004 harvest of Chinook salmon, not normally a commercially important species in LCI, totaled 1,632 fish, the second highest catch during the last decade. This harvest exceeded the long-term average of 1,400 but was well below the record high harvest of 2,300 fish taken in 1995 (Figure 3, Table 5). Virtually all of the catch came from the Southern District (Table 5) and can be primarily attributed to Chinook salmon enhancement projects at Halibut Cove Lagoon and Seldovia Bay, both of which are intended to benefit recreational users. Set gillnetters accounted for 86% of the Southern District Chinook catch (Table 6), with purse seiners taking the remaining 14%.

### **SOCKEYE SALMON**

The 2004 LCI sockeye salmon harvest of 130,100 fish (Figure 4, Table 7) was the lowest since 1994 and represented only about 40% of the recent 10-year average. Despite accounting for only about 4% of the LCI salmon harvest in numbers of fish, sockeye salmon provided about 40% of the exvessel value of the entire salmon fishery during 2004 (Tables 3 and 4). Harvests of enhanced runs of sockeye salmon returning to Leisure and Hazel Lakes in the Southern District, at an estimated combined total of 34,600 fish, were far below the historical average provided by these two projects. In the Kamishak Bay District, the enhanced return to Kirschner Lake produced a harvest of 16,400 sockeye salmon, all of which was utilized for hatchery cost recovery. At Bear Lake in Resurrection Bay of the Eastern District, the cumulative commercial seine catch of these “early run” sockeye salmon totaled nearly 17,000 fish. The return of sockeye salmon to English Bay Lakes, which is supplemented through enhancement, produced a harvest of about 2,600 fish for nearby commercial set gillnetters and also achieved the sustainable escapement goal range established for this system. Additional fish were harvested for subsistence use by villagers of Port

Graham and Nanwalek. Recent sockeye returns to the English Bay Lakes system are the result of an ongoing rehabilitation/enhancement project originally initiated by ADF&G in the late 1980's and presently being conducted by CRRC in conjunction with the village of Nanwalek.

Natural returns of sockeye salmon to LCI systems were considered relatively good, with all four systems achieving their established escapement goals. In the Outer District, Delight Lake escapement, enumerated via a picket weir in conjunction with aerial surveys, fell within but near the lower end of its sustainable escapement goal range of 5,600 – 12,600 sockeye salmon. The peak daily aerial survey escapement estimate at nearby Desire Lake, with a sustainable escapement goal range of 8,800 – 15,200, totaled nearly 11,000 sockeye salmon, while also producing a harvestable surplus of about 11,000 fish for the seine fleet. At Mikfik Lake in the Kamishak Bay District, no directed fishing effort or harvest occurred during the season, thus the entire run entered the system as escapement and slightly exceeded the established goal range of 6,300 – 12,150 fish. The sockeye return to small Aialik Lake in the Eastern District also slightly exceeded the escapement goal of 3,700 – 8,000 fish but no fishing was allowed to target this stock.

## **COHO SALMON**

The coho salmon resource is not extensive in the LCI management area, and as a result, this species rarely attains commercial prominence. The commercial harvest of 11,200 coho salmon in 2004 was approximately equal to the recent 10-year average for this species (Figure 5, Table 8). For the first time in many seasons, the majority of the harvest occurred in a district other than the Eastern District, which usually dominates coho catches because of the Seward Silver Salmon Derby and CIAA hatchery cost recovery at Bear Lake. Rather, seine effort in Kamishak Bay District resulted in the harvest of about 5,400 cohos, representing just under half of the area wide total. The sport derby catches in Seward accounted for nearly 40% of the total, while set gillnetters in the Southern District took another 10% of the coho catch. Regarding sport derby catches, it should be noted that all coho salmon entered into the Seward Silver Salmon Derby are subsequently sold by the city of Seward, organizer of this sport fishing derby, to a commercial processor. Therefore, these catches are considered “commercial harvests” and are listed in the commercial catch tables to document this fact. In 2004, a total of 4,400 cohos were entered into the Seward Silver Salmon Derby.

Coho salmon run assessment in LCI is limited, with commercial, sport, and personal use harvests providing the best indicators of run strength, and overall the returns during 2004 were considered above average. One aerial survey was flown specifically for coho salmon this season, indicating large escapement into Clearwater Slough, the major index stream at the head of Kachemak Bay.

## **PINK SALMON**

Returns of pink salmon, the dominant species in numbers of commercially harvested fish in LCI, nearly achieved preseason expectations in 2004, with an overall harvest of more than 2.5 million fish (Figure 6, Table 9). This figure is over 65% greater than the most recent 10-year average and represents the third highest catch of this species during that time frame. Almost 98% (2.46 million pinks) of the total was taken in the Southern District (Table 9), virtually all of which was a direct result of Tutka and Port Graham Hatcheries' production. However, nearly the entire Southern District total was utilized for hatchery cost recovery at the two respective hatcheries. The estimated hatchery return to the Tutka facility, including escapement and commercially harvested fish, was

nearly 1.2 million pinks, approximately doubling the preseason projection of 652,000 fish. Ironically, although the marine survival for this season's adult return was a considerable improvement over recent returns, CIAA announced prior to the season that the Tutka Hatchery facility would suspend operations at the conclusion of this season, and therefore no broodstock was collected. At Port Graham Hatchery, the estimated hatchery return totaled approximately 1.35 million pinks, easily the highest on record since adult fish began returning to the facility in 1992.

The Outer District produced the greatest contribution of naturally produced pink salmon to LCI harvests, with a total catch of nearly 43,000 fish (Table 9). The majority of the catch came from Port Dick Subdistrict, but much of that harvest was incidental during effort directed at chum stocks. For the most part, pink salmon systems along the outer Gulf of Alaska coast experienced relatively weak returns, likely due to the severe flooding experienced throughout the Kenai Peninsula during the fall of 2002. In the Kamishak Bay District, overall returns of pinks were also relatively weak and provided little incentive for targeted harvest given the low prices and lack of tender service. Despite the weaker than anticipated pink salmon returns, escapements were achieved at most systems within the management area.

## **CHUM SALMON**

Chum salmon were undoubtedly the bright spot in the 2004 LCI commercial salmon season. The chum harvest of over 200,000 fish was the highest catch for the species in LCI since 1988 and was nearly four times the 20-year average of 52,000 (Figure 7, Table 10). This was the fifth consecutive season of above average chum harvests, fueled once again by strong returns to systems in Kamishak Bay on the west side of LCI. Escapements into most Kamishak Bay chum systems were good, with the exception of McNeil River, where the escapement fell short of its established goal range for the twelfth time in the last 15 years. Elsewhere in the management area, Outer District chum returns were considered better than any recent season, and a directed fishery was allowed in Port Dick for the first time in well over a decade, resulting in the harvest of nearly 28,000 chums (Table 10).

## **LOWER COOK INLET COMMERCIAL SET GILLNET FISHERY**

An Area H set gillnet permit allows fishing in any part of Cook Inlet (both Upper and Lower). However, there are only five beaches in LCI, all located along the south shore of Kachemak Bay in the Southern District (Figure 2), where commercial set gillnets may be used. The limited area provides only enough productive fishing sites to accommodate approximately 25 set gillnet permits.

The 2004 LCI all-species set gillnet harvest totaled 24,500 fish (Figure 8, Table 6), falling far short of both the recent 10- and 20-year averages. Set gillnet effort this season totaled 20 permits, less than the 24 permits fished during each of the last two seasons and slightly less than the average of 22 permits fished over the past decade. Catches were dominated by sockeye salmon at 78% (16,100 fish) followed by Chinook salmon at 7%. For comparison, typical species composition in the commercial set gillnet fishery during the past decade has been 57% sockeye salmon, 32% pinks, 4% cohos, 6% chums, and 2% Chinooks. The sockeye total for 2004 is less than half of the recent 10-year average of 40,000 fish for this species (Table 6). Catches of Chinook salmon, at 1,400 fish,

were the fourth highest during the last 10 years and greater than the most recent 10- and 20-year averages for the species. As is typical, enhancement efforts directed at recreational fisheries in Seldovia Bay and Halibut Cove Lagoon are primarily responsible for producing the Chinooks taken by commercial gillnets during 2004.

The current commercial set gillnet season in LCI opens by regulation on the first Monday in June and extends through September 30. The weekly fishing schedule, also defined in regulation, amounts to two 48-hour fishing periods per week, from Monday 6:00 a.m. until Wednesday 6:00 a.m., and from Thursday 6:00 a.m. until Saturday 6:00 a.m. Historically, most subdistricts remain on the normal weekly fishing schedule for the duration of the fishing season, except for set gillnet fishing in Halibut Cove Subdistrict. There, in waters near Ismailof Island (Figure 2), set gillnet fishing starts on the normal schedule of two 48-hour periods at the beginning of the season, but after the 4<sup>th</sup> of July holiday the weekly fishing period is modified by emergency order to five days per week, from 6:00 a.m. Monday until 6:00 a.m. Saturday. The five-days-per-week schedule is identical to that of commercial seiners fishing in Halibut Cove Subdistrict, which traditionally opens to the latter gear group between June 16 and June 26.

The reasons for the inseason change to the weekly fishing periods for set gillnetting in Halibut Cove Subdistrict, as well as the liberal seine fishing schedule in that subdistrict, are largely predicated on three Southern District enhancement projects (*see* LCI SALMON ENHANCMENT AND REHABILITATION). Two similar projects, one at nearby Leisure Lake in China Poot Bay and the second at Hazel Lake in Neptune Bay, both involve the stocking of sockeye salmon fry for the express benefit of the commercial fishery. The third project involves the release of Chinook salmon smolt in waters of Halibut Cove Lagoon, which is adjacent to the area of the commercial set gillnet fishery. The Chinook salmon project is intended to benefit recreational fishermen. Because sockeye salmon returning to the Leisure and Hazel Lake stocking sites are prevented by migrational barriers from reaching suitable spawning habitat, a 100% harvest of the returns is desired. Since the inception of these programs, seiners in Halibut Cove Subdistrict have been allowed to fish on a five-days-per-week fishing schedule to maximize the opportunity to harvest sockeye salmon returning to the stocking sites. The liberalization of commercial set gillnet fishing time to five days per week is normally delayed until after the 4<sup>th</sup> of July in order to provide maximum opportunity for sport fishermen to harvest remaining Chinook salmon bound for Halibut Cove Lagoon during that major holiday.

## **2005 LOWER COOK INLET SALMON HARVEST PROJECTIONS**

### **SOCKEYE SALMON**

Sockeye salmon harvest projections in Lower Cook Inlet are based on both forecasts of fish returning to enhancement sites and average historical harvests of natural runs. The preliminary 2005 forecasted harvest of sockeye salmon is 297,000 fish, more than twice the 130,000 fish landed in 2004 and only slightly less than the average annual catch of 322,000 sockeye salmon during the last decade. If realized, this harvest would represent the fourth highest for sockeye salmon in LCI over the past 10 years. Returns to Leisure and Hazel Lakes in the Southern District, with a combined harvest forecast of nearly 114,000 fish, to Bear Lake in the Eastern District, with a catch

predicted to approach 73,000 fish, and to Kirschner Lake in the Kamishak Bay District, with a harvest forecast of over 24,000 fish, are once again expected to be the major contributors to enhanced sockeye production. Natural returns to the Southern, Outer, Eastern, and Kamishak Bay Districts could contribute up to 86,000 sockeye salmon to the 2005 commercial harvests based on average annual catches.

## **PINK SALMON**

Although LCI pink salmon returns have traditionally been considered odd-year dominant over the past two decades, that trend was thrown into question following relatively strong returns to at least some systems in the management area in even years beginning in 1998. The 2005 LCI pink salmon harvest is projected to exceed 3.6 million fish, which would make it the highest catch on record. Returns to Tutka Bay Hatchery, the last for this facility after CIAA announced that operations would be suspended at the conclusion of 2004, are expected to provide a catch of around 1.22 million pinks, but as was the case in 2004 virtually all are expected to be used to cover the operational expenses for and debt incurred by the facility over the past several years. The pink salmon return to Port Graham Hatchery is forecasted to provide a harvest of around 675,000 pinks, but again this catch will likely be utilized for hatchery cost recovery. Pink salmon escapements to most major systems in 2003 were considered excellent, and the resulting natural production could theoretically contribute up to 1.74 million fish to the 2005 harvests. However, as has been the case in recent years, market conditions and tender availability in remote districts will likely play a larger role in actual commercial pink salmon harvests than the magnitude of the returns themselves.

## **CHUM SALMON**

Based solely on the average annual catch since 1989, chum salmon harvests in LCI during 2005 are forecasted to total approximately 35,000 fish. However, LCI chum salmon returns have been relatively strong for five consecutive seasons, especially to systems in Kamishak Bay on the west side of LCI, and commercial catches exceeded the 2005 forecast figure during each of those seasons. This information strongly suggests that next season's harvests could surpass the forecast. Because the price paid and market demand for this species will likely affect the actual harvests, the chum forecast should be interpreted with caution.

## **CHINOOK AND COHO SALMON**

No formal harvest forecast is prepared for Chinook or coho salmon in LCI. However, average annual harvests since 1980 suggest that about 1,300 Chinook and 14,000 coho salmon can be expected to contribute to LCI commercial harvests in 2005.

The following table summarizes the preliminary projected harvest figures by species in the Lower Cook Inlet management area during 2005:

	<u>Natural</u>	<u>Enhanced</u>	<u>Total</u>
CHINOOK	<sup>a</sup>	<sup>a</sup>	1,300 <sup>a</sup>
SOCKEYE	85,800 <sup>b</sup>	211,200 <sup>c</sup>	297,000
COHO	<sup>a</sup>	<sup>a</sup>	13,600 <sup>a</sup>
PINK	1,737,500	1,893,500 <sup>c</sup>	3,631,000
CHUM	35,000 <sup>b</sup>	0	35,000
<b>Total</b>	<b>1,858,300</b>	<b>2,104,700</b>	<b>3,977,900</b>

<sup>a</sup> Commercial harvest forecasts of Chinook and coho salmon represent average harvests since 1980 and are comprised of a combination of naturally-produced fish as well as fish produced from enhancement programs in LCI; no attempt is made to separate the two components.

<sup>b</sup> Forecasts for naturally-produced sockeye and chum salmon are simply average annual commercial harvests since 1980 and 1989 (respectively).

<sup>c</sup> Includes common property plus cost recovery harvests.

## **LOWER COOK INLET SALMON ENHANCEMENT AND REHABILITATION**

### **INTRODUCTION**

Fisheries enhancement has played an important role in LCI salmon production for over 25 years. Natural adult salmon returns to the LCI area continue to demonstrate wide fluctuations, often the result of environmental impacts such as flooding or ice scouring on spawning grounds. Since their inception in the mid-1970's, enhancement and rehabilitation projects have made significant contributions to both commercial and sport fishing harvests. These contributions have historically ranged from 24% to 90% of the entire LCI commercial salmon harvest and are expected to remain high in future years.

Projects initiated by the ADF&G and presently being undertaken by CIAA, PGHC, and/or CRRC provided an estimated 88% (2.53 million salmon) of the total 2004 LCI commercial harvest of 2.87 million fish. The Leisure/Hazel, English Bay, Kirschner, and Bear Lakes sockeye salmon enhancement projects produced about 54% (70,200 fish) of the total LCI sockeye harvest of 130,100 fish in 2004. Combined Tutka Lagoon and Port Graham Hatcheries production accounted for 98% (2.46 million fish) of the 2004 LCI commercial pink salmon harvest of 2.52 million fish.

Using average fish weights and average prices per pound in LCI, the estimated contribution of salmon produced by CIAA and PGHC was 55% (\$0.693 million) of the \$1.259 million total value of the 2004 LCI commercial salmon harvest. About 31% (\$0.396 million) of the total exvessel value of the fishery was utilized for hatchery cost recovery purposes (Table 4). A brief description of the current or notable enhancement projects specifically affecting the commercial fishery in LCI follows.

## **TUTKA LAGOON HATCHERY**

The Tutka Lagoon Salmon Hatchery/Rearing Facility, located in Tutka Bay of the Southern District (Figure 10), was constructed in 1976 by the state of Alaska, with an initial production capacity of 10 million salmon eggs. Operation of the facility was transferred to CIAA in the early 1990's, and expansion over time, including major renovation work during the winter of 1993-94, increased its capacity to approximately 150 million eggs. Pink salmon were the primary species produced at the hatchery, while secondary chum enhancement was discontinued in favor of experimental efforts directed toward sockeye salmon in the mid/late 1990's. Although the hatchery had a sockeye egg capacity of 1.8 million eggs, and raceways to accommodate the resulting fry, efforts to incubate and rear sockeye smolts were plagued by the infectious hematopoietic necrosis (IHN) virus, which resulted in a suspension of the sockeye program.

In 2004 the adult pink salmon produced by Tutka Lagoon Hatchery totaled nearly 1.2 million fish. No attempt was made to separate the contribution resulting from natural spawning in Tutka Creek. The estimated 1.8% overall survival rate was slightly less than the estimated long-term average of 2.0% but was nonetheless the highest since 2000. The entire harvest of pinks originating from the hatchery, except for a minor amount apportioned to the seine and set gillnet fisheries, was utilized for hatchery cost recovery. The total estimated catch of about 1.177 million Tutka Hatchery pink salmon accounted for approximately 48% of the pink salmon landed in the Southern District and 47% of the entire LCI commercial pink salmon harvest. Pinks taken for hatchery cost recovery purposes from the Tutka Bay Subdistrict totaled 1.175 million fish, worth approximately \$75,100 but failing to achieve CIAA's revenue goal of \$1.185 million.

Just prior to the 2004 salmon season, CIAA announced that it would indefinitely suspend operations at Tutka Hatchery at the conclusion of the season. As a result, no broodstock or eggs were collected from returning adult pink salmon this year, and no further juvenile releases are planned. An estimated 55 million pink salmon fry were released in the spring of 2004, the last planned release for the facility, with the final adult return from this release occurring in 2005.

## **LEISURE AND HAZEL LAKES SOCKEYE SALMON STOCKING**

Leisure Lake, also called China Poot Lake and located on the south side of Kachemak Bay in the Southern District (Figure 10), historically was a system barren of sockeye salmon. A study initiated in 1976 involved the stocking of hatchery-produced sockeye salmon fry to determine optimum stocking levels prior to and after lake enrichment through fertilization. Because a barrier falls below the lake precludes any upstream migration and subsequent adult spawning, it is desirable to harvest all returning adult fish in the terminal harvest area, China Poot Bay. Beginning in 1988, a similar sockeye stocking program was initiated at Hazel Lake, which is located approximately three miles south of Leisure Lake and empties into Neptune Bay. Since the initiation of these projects, nearly 2.8 million adult sockeye salmon were estimated to have returned as a result of these stocking programs, making a significant contribution to the commercial and recreational sockeye harvests in the Southern District.

Because of the close proximity of the two terminal harvest areas, and the absence of a mark/recovery program, adult returns to Leisure and Hazel Lakes cannot be separately identified through sampling within the commercial catches and are therefore presented as a combined total. The cumulative total sockeye return to Leisure and Hazel Lakes in 2004 was estimated to be about 41,000 fish, or less than one-fourth of the recent 10-year average. The cumulative commercial harvest of an estimated 34,600 fish comprised approximately two-thirds of the Southern District sockeye harvest and almost 27% of the total LCI sockeye salmon harvest.

An estimated 2.002 million sockeye salmon fry were released into Leisure Lake in 2004 (Table 11), while 351,000 sockeye fry were stocked into Hazel Lake.

In an important development regarding the LCI sockeye lake stocking program, the brood source historically used by CIAA to obtain eggs for this project, from Tustumena Lake, is no longer available because of a recent court ruling. As a result, CIAA is investigating alternative brood sources in order to continue stocking Leisure, Hazel, and Kirschner Lakes in LCI. As a means to ensure continuity in the program, CIAA successfully obtained a permit to utilize broodstock from Hidden Lake, located in the Kenai National Wildlife Refuge in Upper Cook Inlet, to supply sockeye eggs for the three aforementioned lakes. The permit was issued for one year only (Brood Year 2004), and CIAA plans to continue its efforts to secure a long-term brood source for the LCI program.

## **ENGLISH BAY SOCKEYE SALMON REHABILITATION**

The English Bay Lakes system, located on the southwestern tip of the Kenai Peninsula (Figure 10), has the only significant stock of sockeye salmon native to the Southern District of LCI. Unfortunately, the English Bay sockeye returns declined to their lowest recorded levels in the last half of the 1980's decade. Sockeye escapement estimates between 1985 and 1993 ranged from 2,500 to 8,900 fish; all but one of these years (1993) was well below the 20-year average of 7,800 fish. The decline of the English Bay sockeye run resulted in a very restrictive management strategy for this area. The commercial, sport, and subsistence fisheries were closed during the sockeye run for most years mentioned. Efforts to rehabilitate this depressed stock were initiated by ADF&G with an egg take in 1989 and the subsequent release of 350,000 sockeye salmon fry in 1990 (Table 11). Chugach Regional Resources Commission (CRRC), operating the Nanwalek Salmon Enhancement Program (NSEP) in cooperation with the village of Nanwalek (formerly English Bay) and the Bureau of Indian Affairs, has since taken over this enhancement project and continued egg collections, fry stockings, and operation of a smolt/adult enumeration weir.

Whereas the escapement figures for English Bay Lakes prior to 1994 were index estimates based on aerial surveys, escapements beginning with the 1994 season have been monitored through the use of a counting weir, operated by CRRC. Sockeye returns have improved since 1994 with escapements reaching the desired goal in six out of the past eleven seasons. Although extensive closures of the subsistence, commercial, and sport fisheries have been much less frequent during the past several seasons due to improved returns, selective closures of individual fisheries have occurred to protect fish for escapement.

The preseason forecast for the sockeye salmon return to English Bay Lakes in 2004 was only 18,400 fish, while the sustainable escapement goal (SEG) range was 6,000 to 13,500 fish.



Because hatchery broodstock are collected from escapement into the lake, hatchery brood requirements were added to the SEG to obtain a “desired in-river return” totaling 9,350 – 16,850 fish. Given the potentially small projected surplus, the commercial set gillnet fishery in Port Graham Subdistrict, including both the Port Graham and English Bay Sections, was kept closed at the beginning of June to afford maximum protection to returning adults for escapement and subsistence purposes. Inseason escapement counts at the weir showed that the desired in-river return would be achieved, and the commercial set gillnet was therefore opened to fishing beginning July 1. Final escapement into the lake totaled 16,700 sockeye salmon, falling at the upper end of the desired range, while commercial set gillnetters in Port Graham Subdistrict harvested an additional 2,600 fish. Subsistence set gillnetters further harvested an unknown number of sockeye salmon bound for English Bay Lakes. The NSEP collected approximately 1,400 adult sockeye salmon for use as broodstock this season, resulting in an egg take of about 1.77 million.

An estimated 50,000 sockeye fry were released into English Bay Lakes in August of 2004 (Table 11). The release date for this season was earlier than planned because of a water volume problem at Port Graham Hatchery, where the fish were rearing. Prior to this season, fry were released into the lake after undergoing long-term rearing in netpens within the lake, but the department prohibited that practice after the netpen program experienced numerous outbreaks of IHN and other diseases, causing significant mortalities and concern over potentially infecting wild fish. Port Graham Hatchery recently applied for a Fisheries Transport Permit to transfer eyed sockeye eggs (Brood Year 2004) from Port Graham Hatchery to Trail Lakes Hatchery for rearing until the scheduled release of these juveniles in late 2005.

## **BEAR LAKE AND GROUSE LAKE SOCKEYE SALMON ENHANCEMENT**

Bear Lake, located at the head of Resurrection Bay in the Eastern District (Figure 10), has been the target of sockeye salmon enhancement efforts since the late 1980’s. In addition, this system has been the centerpiece of a Sport Fish Division coho salmon enhancement program since 1962, part of which included limiting the escapement of sockeye salmon into the lake. As a result, only a small remnant run of naturally spawning sockeye salmon remained at Bear Lake until the late 1980’s. In an effort to produce increasing numbers of adult sockeye salmon without adversely affecting coho salmon production, as mandated by Alaska Board of Fisheries (BOF) policy, CIAA undertook a sockeye stocking program beginning in 1989 with the release of 2.2 million sockeye fingerlings. Since then, additional releases of fry, fingerlings, and accelerated growth (“zero check”) smolts have occurred, ranging from 0.2 to 2.4 million juvenile sockeye salmon each year (Table 11).

Adults returning to this stocking site are specifically intended for the commercial seine user group, with an SEG range of 700 – 8,300 sockeye salmon in place for Bear Lake. Similar to English Bay Lakes, adults for broodstock purposes are collected from lake escapement, with the 2004 desired in-river return totaling 5,600 – 13,200 fish. Historical enhanced adult sockeye returns to the lake have ranged from less than 1,000 fish to nearly 53,000, with an average of about 25,000. This average is hypothesized to be less than the system is capable of producing. Nonetheless, the program at Bear Lake has provided increased opportunity for commercial

harvests, with annual seine catches ranging up to 36,000 fish and hatchery cost recovery harvests ranging as high as 21,000 fish.

In 2004, the sockeye return to Bear Lake totaled approximately 29,000 fish, similar to the previous two years' returns. The seine fleet harvested nearly 17,000 fish, while the remainder escaped into Bear Lake. A combined total of 3.0 million sockeye fry and pre-smolt were stocked into Bear Lake this season (Table 11).

In the mid-1990's, CIAA attempted a second sockeye enhancement project at Grouse Lake, also in Resurrection Bay of the Eastern District (Figure 10), utilizing a broodstock with later run timing than that of the Bear Lake stock. Adults returning because of the Grouse Lake enhancement project were for the express purpose of hatchery cost recovery; no directed commercial seine fishery was planned or intended for these returns. Unfortunately, the project never achieved the results desired by CIAA, either due to lower than expected returns or because of extremely low product quality of the returning fish. Based on the lack of success and disappointing returns, CIAA suspended the Grouse Lake stocking program after the 1998 season, and no adults returned to the site after 2001. CIAA now believes that by combining the Bear Lake and Grouse Lake salmon enhancement projects into one "early run" project at Bear Lake, it can meet the original goals of both projects.

To develop an adult sockeye return to Resurrection Bay deliberately sized to maintain the current Bear Lake salmon enhancement project and support operation of CIAA's non-Tutka enhancement programs, CIAA has begun to increase sockeye salmon stocking at Bear Lake through fall presmolt and spring smolt releases. CIAA estimates that the current Bear Lake spring fry release goal (2.4 million), combined with the presmolt (800,000) releases, will result in the annual production of 862,000 smolts. Additional annual releases of 560,000 smolt are also planned, ultimately resulting in the subsequent annual return of up to 100,000 adults. Under the amended Bear Lake Management Plan (5 AAC 21.375), CIAA has proposed to establish all marine waters of Resurrection Bay as a hatchery Special Harvest Area (SHA). In order for seiners to harvest fish returning to Bear Lake, they must first agree to become an authorized agent of CIAA, thus allowing them to fish within the SHA. An agreement between the seiners and CIAA would then specify that the revenues generated from the sale of sockeye salmon harvested within the SHA would be split according to a rate determined prior to the season.

The history of the Bear Lake sockeye salmon run is quite unique. Efforts were made by ADF&G in the late 1960's and early 1970's to eradicate the naturally occurring sockeye salmon run in order to maximize coho salmon production. The Bear Lake Management Plan, adopted in 1985, directed ADF&G to establish a sockeye salmon escapement goal and to manage fisheries to meet this goal. While an escapement goal of 1,000 sockeye salmon was listed in various ADF&G reports after 1985, recent management of this run has been strongly influenced by the operation of Trail Lakes Hatchery (TLH) and the Bear Lake sockeye enhancement program. Prior to 2001, the TLH Annual Management Plan specified a minimum escapement goal of 5,000 sockeye salmon and a maximum of 8,000 for Bear Lake. These goals were established to ensure the availability of hatchery broodstock rather than to produce a sustained yield from a naturally spawning run. Once allowed to migrate past the weir and enter the lake, sockeye salmon are allowed to mature before being collected for broodstock; fish excess to broodstock requirements escape to spawn naturally within the system.

In 2001, the department conducted an escapement goal review of all salmon systems in the LCI management area. After carefully reviewing this study, the Alaska Board of Fisheries subsequently adopted the sustainable escapement goals (SEG's) recommended in the department's report. For Bear Lake, the new SEG was 700 – 8,300 sockeye salmon, while the “desired in-river return” (escapement plus hatchery broodstock) became 5,600 – 13,200 sockeye salmon. The latter range should adequately account for both natural spawning requirements in the system and the broodstock requirements necessary to achieve CIAA's egg take goal of 6.0 million sockeye eggs.

## **OTHER SOCKEYE SALMON LAKE STOCKING**

Kirschner Lake in the Kamishak Bay District (Figure 10) has been the site of an ongoing fry stocking project since 1987, with annual fry plantings ranging from 0.173 to 0.867 million (Table 11). Nearby Bruin Lake was also stocked between 1990 and 1996, but stocking was suspended after that time due to disappointing returns. Adults returning to the Kirschner Lake site are prevented from reaching the spawning grounds by a steep falls at tideline, therefore all fish are targeted for harvest by the seine fleet. Combined adult returns to these two stocking sites have averaged over 30,000 sockeye salmon annually, and the Kirschner Lake project has remained one of the Lower Inlet's steadiest producers of enhanced sockeye salmon despite limnological characteristics that would suggest otherwise. The estimated adult return to Kirschner Lake in 2004 approached 17,000 adults, almost 50% greater than the preseason forecast of 12,000, while an estimated 251,000 sockeye salmon fry were released into the lake.

Several other lakes in the Kamishak Bay District, evaluated through pre-stocking studies conducted between 1986 and 1989, were stocked regularly in the late 1980's and early 1990's but failed to produce significant adult returns and the programs were suspended indefinitely. These lakes included Ursus Lake, Upper Paint Lake, Lower Paint Lake, and Elusivak Lake (*see PAINT RIVER FISH PASS* for additional information on the latter three lakes).

Stocking of sockeye salmon at Chenik Lake, also in the Kamishak Bay District, was suspended in the mid-1990's due to an outbreak of naturally occurring IHN within the lake system. After several years of very low adult returns and meager escapements following the cessation of stocking, the magnitude of the 2003 return suggested that successful natural production was occurring. After averaging less than 2,300 sockeye salmon over the previous decade, during which time no commercial exploitation occurred, the Chenik Lake escapement spiked to an aerial index of nearly 14,000 sockeye salmon in 2003. In 2004, early aerial assessment showed the return to be significantly stronger, and with an SEG of 2,000 to 9,300 sockeye salmon in place for this system, commercial effort was warranted in an effort to keep the escapement within the established SEG range. Relatively liberal fishing periods resulted in the harvest of over 33,000 sockeye salmon in Chenik Subdistrict, while escapement into Chenik Lake was estimated via aerial surveys at 17,000 fish. The 2004 season marked the first directed commercial effort on Chenik sockeye salmon in over a decade.

## **HALIBUT LAGOON/SELDOVIA BAY CHINOOK SALMON ENHANCEMENT**

The Chinook salmon enhancement project at Halibut Cove Lagoon, located in the Southern District (Figure 10), involves the release of Chinook salmon smolts, with the objective of increasing sport fishing opportunities in Kachemak Bay. This is the oldest and one of the most popular sport fishing enhancement projects in LCI, operating continually since 1970 with an annual release of smolts. Although adult returns from the Halibut Cove Lagoon stocking program are not intended for commercial harvest, there is incidental harvest of these Chinook salmon in the commercial set gillnet and seine fisheries. The long-term estimated incidental harvest of enhanced Chinook salmon by commercial fishermen in Halibut Cove Subdistrict has been around 20-30% of the total return. Figures for this incidental harvest during 2004 are unavailable but are thought to be near the historical average. Total commercial harvest of Chinook salmon in Halibut Cove Subdistrict in 2004 was 883 fish, with set gillnetters taking about 98% of the total and seiners harvesting the remainder.

The Seldovia Bay Chinook salmon enhancement project in the Southern District (Figure 10) is very similar to that of Halibut Cove but has been in place only since 1987. Smolts are released into the small boat harbor at Seldovia, with adults returning to this site primarily for the benefit of recreational fishermen. Incidental harvest of these fish occurs in the Seldovia Bay commercial and subsistence gillnet fisheries, but because no mark/recovery program is in place to assess the returns, no attempt is made to identify the proportion of hatchery fish in the catches. Total Chinook harvest in Seldovia Bay in 2004 was 244 in the commercial fishery and 89 in the subsistence fishery.

## **PORT GRAHAM HATCHERY**

In an effort to supplement natural fish production and provide increased employment opportunities in the native village of Port Graham, the Port Graham Hatchery Corporation (PGHC) applied for and received a permit to operate a private non-profit (PNP) hatchery in 1992. Port Graham is located approximately 21 nautical miles southwest of Homer on the south side of Kachemak Bay (Figures 1, 2, and 10). The hatchery had conducted experimental pink salmon egg-takes and fry releases via a scientific/educational permit from 1990 through 1992, while these activities have since been permitted in the Port Graham Hatchery Basic and Annual Management Plans (BMP/AMP). Adult pink salmon returns to the hatchery prior to 1997 were disappointing and/or complete failures despite predictions of at least moderate returns. In 1997, returns finally achieved the preseason forecast level of 80,000 to 200,000 pinks, with a total run size estimated at about 186,000 fish. Since that time, however, pink returns have been mostly weak, particularly in 1999 due to the devastating fire that destroyed the hatchery and cannery complex in early 1998, and in other years due to reduced releases or unknown reasons. Exceptions occurred in 2002 when 335,000 pinks returned, and again in 2004, when the estimated hatchery return exceeded 1.35 million fish, the highest on record to date for the facility. The hatchery plans to continue fry releases in an effort to maintain a successful pink salmon program.

Although all efforts prior to 1993 were directed towards pink salmon, sockeye salmon production also has been underway at the Port Graham Hatchery. Under contract to the Nanwalek Salmon Enhancement Project (NSEP), the facility has incubated sockeye salmon eggs

collected from English Bay Lakes, destined for release back into that system, since 1993. The 1998 fire also hampered that project, but the hatchery complex was subsequently rebuilt, and efforts to maintain the NSEP sockeye salmon program continues. Unfortunately, the return of adult sockeye salmon to English Bay Lakes is predicted to be very weak over the next several years.

Port Graham hatchery has also initiated a second sockeye salmon program designed to promote an adult return directly to the hatchery. Eggs collected from English Bay Lakes brood, under an agreement with NSEP, are subsequently incubated in the Port Graham Hatchery facility. The emergent fry are eventually transferred into saltwater net pens under a very controlled but accelerated acclimation program. Once acclimation objectives are achieved, the fry are further reared to a pre-determined size and eventually released. The first release of juveniles from this program, estimated at around 109,000 fish, occurred in 2004, thus no adults have begun returning to the facility as a result of this project.

## **PAINT RIVER FISH PASS**

The Paint River system in the Kamishak Bay District (Figure 10) contains at least 40 kilometers (25 miles) of potential salmonid spawning and rearing habitat. Currently the Paint River system is barren of salmon because of a waterfall at tide line that was impassable prior to 1993. ADF&G and CIAA initiated feasibility studies for a fishway in 1979. CIAA received State and Federal grant funds to build the fishway, completing construction in the fall of 1991. ADF&G Commissioner Carl Rosier declared the fish pass officially operational in January 1993.

To test the feasibility of developing a sockeye salmon return to the fish pass project site, the Paint River Lakes were first stocked with sockeye fry in 1986 and annually from 1988 through 1996, except in 1994 when no fry were available (Table 11). Ten consecutive years of meager adult returns, with a high of 1,900 fish observed in 1998, have characterized this project's history. Because adult returns from the plantings have been negligible, CIAA discontinued fry stocking after the 1996 season, with one exception. An experimental release of 500,000 sockeye pre-smolts occurred in the fall of 2002. To evaluate this release, CIAA conducted a smolt weir project in the spring of 2003, as well as a hydroacoustic assessment survey in the fall of the same year. Although neither evaluation project suggested significant numbers of juvenile fish remained in the system, the results proved inconclusive because the originally planted fish could have migrated out of the system prior to the startup of the evaluation projects. Another hypothesis advocated the theory that the resident population of lake trout and grayling in the lake may have preyed heavily on the stocked sockeye juveniles.

## **LOWER COOK INLET PERSONAL USE SALMON NET FISHERY**

### **KACHEMAK BAY FALL COHO SALMON PERSONAL USE FISHERY**

The Southern District (Kachemak Bay) fall coho salmon gillnet fishery dates back prior to statehood under varying names, being known as a “personal use” fishery during the years 1986-1990, 1993, and 1995-2001, and as a “subsistence” fishery in 1991, 1992, and 1994. Numerous court rulings have affected the status of this fishery over the past two decades, causing it to change in status between the two categories. The most recent court action, after the 1994 fishery, reestablished the “subsistence” and “non-subsistence” areas originally created by the Alaska Board of Fisheries (BOF) in 1992, and because most of Kachemak Bay was included in a “non-subsistence” area, the subsistence fishery and the regulations governing it were no longer valid. The BOF re-adopted personal use regulations governing this fishery into permanent regulation for the 1995 season and rescinded the subsistence regulations formerly governing the fishery. Those personal use regulations have remained in effect since that time.

The target species in the Kachemak Bay gillnet fishery is coho salmon, with returning fish a mixture of natural stocks primarily bound for the Fox River drainage at the head of Kachemak Bay and enhanced runs bound for the Homer Spit fishing lagoon and, formerly, Fox Creek/Caribou Lake near the head of Kachemak Bay. The regulations governing the fishery are found in 5 AAC 77.549. Personal Use Coho Salmon Fishery Management Plan. In 1998, after hearing the staff’s concerns regarding the harvest of wild stocks of cohos, the BOF adopted a change to the regulatory guideline harvest range (GHR) in the personal use fishery, from a former range of 2,500 to 3,500 coho salmon to a new range of 1,000 to 2,000 cohos. The new GHR was implemented for the first time during the 1999 season. Incorporated into the management plan is a requirement that cohos taken during the Seldovia area subsistence salmon fishery be included as part of the personal use guideline.

All regulations from the previous year’s fishery remained essentially unchanged for the 2004 personal use fishery. The regulatory opening date for the fishery was August 16. Legal gear was limited to a single set gillnet not exceeding 35 fathoms in length, 45 meshes in depth, and 6 inches in mesh size. Nets were not permitted more than 500 feet from the mean high water mark, and a net could not be set offshore of another net. A permit from the Homer office was required, with an Alaska resident sport fishing license necessary to obtain a permit. The seasonal limit was 25 salmon per head of household and 10 additional salmon per each dependent. Prior to 1991, little department management interaction occurred and the fishery often proceeded until the regulatory closing date of September 15, regardless of the harvest level. Between 1991 and 2003, years of intensive management for the GHR, the total amount of fishing time allowed in this fishery ranged from 72 to 192 hours, or 1.5 to four regularly scheduled 48-hour fishing periods.

Only four cohos were reported during the early August Seldovia subsistence fishery, therefore the GHR remained at 1,000 to 2,000 fish for the personal use fishery. Catch information voluntarily reported after the first 48-hour period indicated a catch of almost 900 coho salmon

harvested by only 30% of the permit holders, nearly achieving the lower end of the GHR and suggesting an exceptionally strong coho return. Using this information, as well as data collected from past personal use fisheries, department staff projected that the catch would fall near the middle to upper end of the GHR by the end of the second fishing period. Therefore, the 2004 Personal Use Coho Salmon Fishery was closed by emergency order at 6:00 a.m. Saturday, August 21, for the remainder of the season after 96 hours of fishing time.

A total of 91 permits were issued for the 2004 fishery (Table 12), while 82 permit holders (90%) phoned in their catches or returned their permits. Of the total number issued, 64 permit holders (70%) actively fished, 18 (20%) did not fish at all, and the remaining nine permit holders (10%) did not report or return their permit. Based on returned permits and voluntary catch reports, the harvest was estimated to be 1,554 coho salmon (Figure 10), 172 pink salmon, 56 sockeye salmon, 7 Chinooks, and 16 chums (Table 12). Despite the nine outstanding permits, these numbers are not expected to increase significantly. The coho total represents the mid-point of the GHR of 1,000 to 2,000 fish. As was the case during 2000, when the Sport Fish Division analyzed tag recovery data, the 2004 catch on the east side of the Homer Spit, where the majority of the effort and harvest occurred, was believed to be of hatchery origin resulting from the enhancement project at the Homer Spit fishing lagoon.

The duration of the 2004 Southern District personal use fishery (96 hours of fishing time) was considerably less than the 1991 – 2003 average of 114 hours. Both the number of permits issued and the active fishing effort continued to display a downward trend experienced over the past five years, and the number of permits actively fished in 2004 was the lowest total since 1974 (Table 11). The coho harvest of 1,505 fish was greater than the 2003 fishery but similar to the previous two seasons. Reasons for the declining trend in participation are likely due to the popularity of other alternative personal use fisheries in Upper Cook Inlet targeting sockeye salmon.

The current GHR of 1,000 to 2,000 coho salmon, implemented in 1999, appears to be producing the desired results of limiting the personal use set gillnet harvest of naturally produced cohos in Kachemak Bay waters. Only one aerial survey of Clearwater Slough, the major coho index stream at the head of Kachemak Bay, was conducted in September to gauge escapements. The coho count of 1,100 fish, obtained on September 8, was considered outstanding.

The fishery in 2005 is expected to be similar to this year's fishery. Both early and late run timing coho adults are expected back during the upcoming season since both variants were stocked as juveniles. As during other recent seasons, attainment of the GHR is expected to occur within two to four 48-hour fishing periods, given average returns. Fishing effort and participation in 2005 is expected to be similar to recent years but could be affected by other alternative fisheries, and the strength of the corresponding salmon returns elsewhere in Cook Inlet. Although limited as an inseason management tool, voluntary catch reports will once again be employed to help determine an appropriate closure time for the 2005 fishery. Based on experience gained during the past 14 years' fisheries, especially the last six, achieving a harvest within the GHR of 1,000 to 2,000 cohos appears quite practical.





## **TABLES AND FIGURES**

**Table 1.-**Commercial, hatchery, and derby salmon catches in numbers of fish by species, district, and gear type, Lower Cook Inlet, 2004.

<b>District</b>						
<b>Gear Type</b>	<b>Chinook</b>	<b>Sockeye</b>	<b>Coho</b>	<b>Pink</b>	<b>Chum</b>	<b>Total</b>
<b>Southern</b>						
Commercial:						
Set gillnet <sup>a</sup>	1,402	16,125	1,174	843	1,238	20,782
Purse seine	228	21,621	267	2,273	138	24,527
Hatchery:						
Purse seine		12,991		2,458,843		2,471,834
<b>Total</b>	<b>1,630</b>	<b>50,737</b>	<b>1,441</b>	<b>2,461,959</b>	<b>1,376</b>	<b>2,517,143</b>
<b>Outer</b>						
Commercial:						
Purse seine	2	11,082	13	42,636	27,911	81,644
<b>Eastern</b>						
Commercial:						
Purse seine		16,645			1	16,646
Derby <sup>b</sup> :						
Hook & Line			4,400			4,400
<b>Total</b>		<b>16,645</b>	<b>4,400</b>		<b>1</b>	<b>21,046</b>
<b>Kamishak</b>						
Commercial:						
Purse seine		35,285	5,367	12,969	177,395	231,016
Hatchery:						
Purse seine		16,372				16,372
<b>Total</b>		<b>51,657</b>	<b>5,367</b>	<b>12,969</b>	<b>177,395</b>	<b>247,388</b>
LCI Total	1,632	130,121	11,221	2,517,564	206,683	2,867,221
Percent	0.06%	4.54%	0.39%	87.81%	7.21%	100.00%
1984-2003						
Average	1,404	283,479	12,212	1,174,242	51,919	1,523,256

<sup>a</sup> 2004 set gillnet totals include a very small number of fish retained for personal use.

<sup>b</sup> Derby catches are fish entered into the Seward Silver Salmon Derby that are subsequently sold to a commercial processor, therefore these catches are considered part of the LCI “commercial harvest”.

**Table 2.**-Commercial salmon catch in numbers of fish by species, Lower Cook Inlet, 1984 – 2004<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1984	714	268,950	16,797	700,622	92,540	1,079,623
1985	1,043	278,694	10,327	1,229,708	30,640	1,550,412
1986	796	234,861	18,852	1,408,293	82,688	1,745,490
1987	1,179	248,848	14,354	201,429	157,018	622,828
1988	1,694	319,008	7,946	921,296	321,911	1,571,855
1989	1,893	163,271	12,089	1,296,926	11,305	1,485,484
1990	1,560	203,895	9,297	383,670	6,951	605,373
1991	1,419	317,947	19,047	828,709	24,232	1,191,354
1992	1,891	176,644	5,902	479,768	22,203	686,408
1993	2,168	233,834	13,477	866,774	4,367	1,120,620
1994	1,231	115,418	14,673	1,647,929	5,469	1,784,720
1995	2,303	265,423	17,709	2,848,464	15,636	3,149,535
1996	1,181	449,685	13,572	451,506	3,764	919,708
1997	1,261	240,173	11,004	2,814,431	5,908	3,072,777
1998	1,071	284,029	16,653	1,457,819	4,647	1,764,219
1999	1,764	476,779	8,033	1,140,488	7,941	1,635,005
2000	1,188	240,932	8,203	1,387,307	73,254	1,710,884
2001	988	216,271	6,667	592,931	88,969	905,826
2002	1,553	290,654	8,329	1,970,061	43,259	2,313,856
2003	1,180	644,257	11,302	856,711	35,686	1,549,136
2004	1,632	130,121	11,221	2,517,564	206,683	2,867,221
20-Year Avg.	1,404	283,479	12,212	1,174,242	51,919	1,523,256
1984-93 Avg.	1,436	244,595	12,809	831,720	75,386	1,165,945
1994-2003 Avg.	1,372	322,363	11,615	1,516,765	28,453	1,880,568
2004 % of Total	0.06%	4.54%	0.39%	87.81%	7.21%	100.00%

<sup>a</sup> Data source: ADF&G fish ticket database.

**Table 3.**-Exvessel value of the commercial salmon harvest in thousands of dollars by species, Lower Cook Inlet, 1984 – 2004<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1984	23	1,393	120	635	242	2,413
1985	47	1,637	86	974	78	2,822
1986	21	1,414	132	1,245	201	3,013
1987	27	1,951	118	295	598	2,989
1988	32	3,812	127	2,237	2,548	8,756
1989	33	1,213	59	1,660	39	3,004
1990	29	1,287	28	306	31	1,681
1991 <sup>b</sup>	19	1,115	36	275	48	1,493
1992 <sup>b</sup>	30	1,152	19	212	53	1,466
1993 <sup>b</sup>	27	802	41	287	7	1,164
1994 <sup>b</sup>	18	496	93	745	9	1,361
1995 <sup>b</sup>	48	1,381	62	1,245	24	2,760
1996 <sup>b</sup>	26	2,113	42	100	5	2,286
1997 <sup>b</sup>	23	1,066	36	1,286	10	2,421
1998 <sup>b</sup>	20	1,224	37	712	9	2,002
1999 <sup>b</sup>	51	2,459	23	470	20	3,023
2000 <sup>b</sup>	31	1,112	19	431	192	1,786
2001 <sup>b</sup>	24	627	15	277	295	1,238
2002 <sup>b</sup>	24	817	18	441	58	1,359
2003 <sup>b</sup>	15	1,965	18	154	40	2,192
2004 <sup>b</sup>	32	496	40	352	339	1,259
1984-2003 Avg.	28	1,452	56	699	225	2,461
2004 % of Total	2.54%	39.40%	3.18%	27.96%	26.93%	100.00%

<sup>a</sup> Values obtained by using the formula: (average price per lb.) x (average weight per fish) x (catch) = Exvessel value; average prices are determined only from fish ticket information and may not reflect retroactive or postseason adjustments.

<sup>b</sup> Includes hatchery cost recovery.

**Table 4.**-Exvessel value<sup>a</sup> of the commercial salmon catch in numbers of dollars by species, gear type, and harvest type, Lower Cook Inlet, 2004.

	Chinook	Sockeye	Coho	Pink	Chum	Total
<b>COMMON PROPERTY - PURSE SEINE</b>						
No. of Fish	230	84,633	5,647	57,878	205,445	353,833
Pounds	1,799	417,908	40,135	207,207	1,684,414	2,351,463
Price/lb.	\$0.33	\$0.80	\$0.44	\$0.05	\$0.20	
Value	\$594	\$334,326	\$17,659	\$10,360	\$336,883	\$699,822
<b>COMMON PROPERTY - SET GILLNET<sup>b</sup></b>						
No. of Fish	1,402	16,125	1,174	843	1,238	20,782
Pounds	18,707	93,299	8,504	2,784	9,052	132,346
Price/lb.	\$1.68	\$1.16	\$0.52	\$0.07	\$0.21	
Value	\$31,371	\$107,939	\$4,387	\$58	\$1,896	\$145,651
<b>HATCHERY - PURSE SEINE</b>						
No. of Fish	0	29,363	0	2,458,843	0	2,488,206
Pounds	0	138,080	0	8,546,783	0	8,684,863
Price/lb.	\$0.00	\$0.39	\$0.00	\$0.04	\$0.00	
Value	\$0	\$53,851	\$0	\$341,871	\$0	\$395,722
<b>SPORT FISHING DERBY<sup>c</sup> - HOOK &amp; LINE</b>						
No. of Fish			4,400			4,400
Pounds			35,999			35,999
Price/lb.			\$0.50			
Value			\$18,000			\$18,000
<b>TOTAL ALL GEARS</b>						
No. of Fish	1,632	130,121	11,221	2,517,564	206,683	2,867,221
Pounds	20,506	649,287	84,638	8,756,774	1,693,466	11,204,671
Price/lb.	\$1.56	\$0.76	\$0.47	\$0.04	\$0.20	
Value	\$31,965	\$496,116	\$40,046	\$352,289	\$338,779	\$1,259,195

<sup>a</sup> Exvessel value is calculated from average prices, which are determined only by fish ticket information and may not reflect retroactive or postseason adjustments.

<sup>b</sup> 2004 set gillnet totals include a very small number of fish retained for personal use.

<sup>c</sup> Fish entered into the Seward Silver Salmon Derby are subsequently sold to a commercial processor and are therefore considered "commercial harvest".

**Table 5.**—Commercial Chinook salmon catch in numbers of fish by district, Lower Cook Inlet, 1984 - 2004<sup>a</sup>.

Year	Southern	Outer	Kamishak	Eastern	Total
1984	661	3	3	47	714
1985	1,007	19	6	11	1,043
1986	776	6	14	0	796
1987	1,158	14	7	0	1,179
1988	1,655	5	33	1	1,694
1989	1,889	1	3	0	1,893
1990	1,546	2	12	0	1,560
1991	1,399	2	17	1	1,419
1992	1,852	0	39	0	1,891
1993	2,162	2	4	0	2,168
1994	1,230	0	0	1	1,231
1995	2,289	12	2	0	2,303
1996	1,180	0	1	0	1,181
1997	1,261	0	0	0	1,261
1998	1,070	0	0	1	1,071
1999	1,760	3	0	1	1,764
2000	1,184	2	1	1	1,188
2001	986	0	2	0	988
2002	1,553	0	0	0	1,553
2003	1,179	1	0	0	1,180
2004	1,630	2	0	0	1,632
20-Year Avg.	1,390	4	7	3	1,404
1984-93 Avg.	1,411	5	14	6	1,436
1994-2003 Avg.	1,369	2	1	0	1,372
2004 % of Total	99.88%	0.12%	0.00%	0.00%	100.00%

<sup>a</sup> Data source: ADF&G fish ticket database.

**Table 6.-**Commercial set gillnet catch of salmon in numbers of fish by species in the Southern District, Lower Cook Inlet, 1984 - 2004<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1984	639	40,987	2,862	17,836	5,008	67,332
1985	958	23,188	3,908	22,898	4,221	55,173
1986	745	21,807	2,827	14,244	2,426	42,049
1987	653	28,209	2,025	9,224	2,419	42,530
1988	1,145	14,758	2,819	29,268	4,423	52,413
1989	1,281	13,970	4,792	16,210	1,877	38,130
1990	1,361	15,863	1,046	12,646	1,938	32,854
1991	842	20,525	5,011	3,954	1,577	31,909
1992	1,288	17,002	848	15,958	1,687	36,783
1993	1,089	14,791	3,088	12,008	2,591	33,567
1994	1,103	14,004	1,073	23,621	2,419	42,220
1995	2,078	19,406	3,564	41,654	3,958	70,660
1996	1,054	69,338	5,779	14,813	2,792	93,776
1997	1,135	59,401	4,475	64,162	4,166	133,339
1998	952	26,131	1,057	24,403	3,754	56,297
1999	1,491	27,646	1,374	5,348	4,313	40,194
2000	1,019	26,503	621	21,845	5,214	55,202
2001	865	28,503	1,811	13,393	3,487	48,059
2002	1,513	46,812	2,393	6,741	4,681	62,140
2003	878	81,722	2,291	7,325	4,998	97,214
2004 <sup>b</sup>	1,402	16,125	1,174	843	1,238	20,782
20-Year Avg.	1,104	30,528	2,683	18,878	3,399	56,592
1984-93 Avg.	1,000	21,110	2,923	15,425	2,817	43,274
1994-2003 Avg.	1,209	39,947	2,444	22,331	3,980	69,910
2004 % of Total	6.75%	77.59%	5.65%	4.06%	5.96%	100.00%

<sup>a</sup> Data source: ADF&G fish ticket database.

<sup>b</sup> 2004 totals include a very small number of fish retained for personal use.

**Table 7.-Commercial sockeye salmon catch (including hatchery cost recovery) in numbers of fish by district, Lower Cook Inlet, 1984 - 2004<sup>a</sup>.**

Year	Southern	Outer	Kamishak	Eastern	Total
1984	160,654	29,276	24,600	54,420	268,950
1985	84,149	91,957	78,250	24,338	278,694
1986	36,838	48,472	146,496	3,055	234,861
1987	89,662	31,845	123,654	3,687	248,848
1988	105,302	9,501	183,952	20,253	319,008
1989	98,052	10,286	46,395	8,538	163,271
1990	82,412	17,404	96,397	7,682	203,895
1991	170,224	6,408	136,612	4,703	317,947
1992	106,793	572	68,847	432	176,644
1993	159,747	4,613	67,650	1,824	233,834
1994	64,531	5,930	35,296	9,661	115,418
1995	164,798	17,642	36,427	46,556	265,423
1996	358,163	14,999	31,604	44,919	449,685
1997	188,402	6,255	11,733	33,783	240,173
1998	196,262	15,991	27,502	44,274	284,029
1999	243,444	51,117	46,913	135,305	476,779
2000	123,574	21,623	31,636	64,099	240,932
2001	155,411	7,339	39,712	13,809	216,271
2002	218,203	21,154	33,921	17,376	290,654
2003	556,037	26,615	51,253	10,352	644,257
2004	50,737	11,082	51,657	16,645	130,121
20-Year Avg.	168,133	21,950	65,943	27,453	283,479
1984-93 Avg.	109,383	25,033	97,285	12,893	244,595
1994-2003 Avg.	226,883	18,867	34,600	42,013	322,362
2004 % of Total	38.99%	8.52%	39.70%	12.79%	100.00%

<sup>a</sup> Data source: ADF&G fish ticket database.



**Table 8.-Commercial coho salmon catch (including hatchery cost recovery and sales from sport derbies) in numbers of fish by district, Lower Cook Inlet, 1984 - 2004<sup>a</sup>.**

Year	Southern	Outer	Kamishak	Eastern	Total
1984	3,193	41	13,027	536	16,797
1985	4,258	3,210	2,024	835	10,327
1986	3,095	5,052	9,935	770	18,852
1987	2,163	2,481	8,079	1,631	14,354
1988	2,987	2	4,471	486	7,946
1989	6,667	72	4	5,346	12,089
1990	1,552	74	26	7,645	9,297
1991	9,415	12	2,337	7,283	19,047
1992	1,277	1	1,488	3,136	5,902
1993	4,431	119	3	8,924	13,477
1994	1,373	993	1,897	10,410	14,673
1995	5,161	1,272	6,084	5,192	17,709
1996	9,543	96	1	3,932	13,572
1997	5,597	63	0	5,344	11,004
1998	2,243	45	0	14,365	16,653
1999	2,757	1,482	0	3,794	8,033
2000	768	20	7	7,408	8,203
2001	2,706	5	9	3,947	6,667
2002	3,769	74	54	4,432	8,329
2003	5,408	4	4	5,886	11,302
2004	1,441	13	5,367	4,400	11,221
20-Year Avg.	3,918	756	2,473	5,065	12,212
1984-93 Avg.	3,904	1,106	4,139	3,659	12,809
1994-2003 Avg.	3,933	405	806	6,471	11,615
2004 % of Total	12.83%	0.12%	47.83%	39.22%	100.00%

<sup>a</sup> Data source: ADF&G fish ticket database.

**Table 9.-**Commercial pink salmon catch (including hatchery cost recovery) in numbers of fish by district, Lower Cook Inlet, 1984 - 2004<sup>a</sup>.

Year	Southern	Outer	Kamishak	Eastern	Total
1984	336,595	89,085	138,145	136,797	700,622
1985	518,889	618,222	194	92,403	1,229,708
1986	542,521	401,755	423,774	40,243	1,408,293
1987	90,522	23,890	72,684	14,333	201,429
1988	852,382	6,094	61,080	1,740	921,296
1989	987,488	52,677	256,669	92	1,296,926
1990	178,087	191,320	2,448	11,815	383,670
1991	253,962	359,664	47,833	167,250	828,709
1992	417,021	146	2,594	60,007	479,768
1993	692,794	159,159	4,205	10,616	866,774
1994	1,589,709	13,200	33	44,987	1,647,929
1995	2,475,312	192,098	169,054	12,000	2,848,464
1996	444,236	7,199	36	35	451,506
1997	2,685,764	128,373	293	1	2,814,431
1998	1,315,042	102,172	1,776	38,829	1,457,819
1999	1,105,267	32,484	807	1,930	1,140,488
2000	1,070,065	306,555	6,214	4,473	1,387,307
2001	542,975	48,559	1,397	0	592,931
2002	953,960	569,955	446,146	0	1,970,061
2003	563,043	281,663	12,005	0	856,711
2004	2,461,959	42,636	12,969	0	2,517,564
20-Year Avg.	880,782	179,214	82,369	31,878	1,174,242
1984-93 Avg.	487,026	190,201	100,963	53,530	831,720
1994-2003 Avg.	1,274,537	168,226	63,776	10,226	1,516,765
2004 % of Total	97.79%	1.69%	0.52%	0.00%	100.00%

<sup>a</sup> Data source: ADF&G fish ticket database.

**Table 10.**-Commercial chum salmon catch in numbers of fish by district, Lower Cook Inlet, 1984 - 2004<sup>a</sup>.

Year	Southern	Outer	Kamishak	Eastern	Total
1984	8,065	3,204	70,736	10,535	92,540
1985	5,513	11,844	8,139	5,144	30,640
1986	5,560	11,701	61,670	3,757	82,688
1987	5,030	28,663	108,412	14,913	157,018
1988	7,742	71,202	218,299	24,668	321,911
1989	3,141	43	7,809	312	11,305
1990	2,433	614	3,597	307	6,951
1991	1,962	14,337	7,853	80	24,232
1992	1,885	181	20,051	86	22,203
1993	2,788	970	600	9	4,367
1994	2,631	32	14	2,792	5,469
1995	4,530	474	10,302	330	15,636
1996	3,511	3	27	223	3,764
1997	4,260	1,575	7	66	5,908
1998	3,956	611	29	51	4,647
1999	4,624	2,062	23	1,232	7,941
2000	5,340	302	66,072	1,540	73,254
2001	3,789	408	84,766	6	88,969
2002	4,803	3,810	34,641	5	43,259
2003	5,730	137	29,800	19	35,686
2004	1,376	27,911	177,395	1	206,683
20-Year Avg.	4,365	7,609	36,642	3,304	51,919
1984-93 Avg.	4,412	14,276	50,717	5,981	75,386
1994-2003 Avg.	4,317	941	22,568	626	28,453
2004 % of Total	0.67%	13.50%	85.83%	0.00%	100.00%

<sup>a</sup> Data source: ADF&G fish ticket database.

**Table 11.**-ADF&G, CIAA, and/or CRRC salmon stocking projects and releases of salmon fry, fingerling, and smolt, in millions of fish, Lower Cook Inlet, 1984 – 2004 (currently active projects highlighted in gray).

YEAR	JUVENILE SOCKEYE SALMON														TOTAL SOCKEYE
	Leisure Lake	Hazel Lake	Port Graham Hatchery	Chenik Lake	Paint Upper	River Lower	Lakes Elusivak	Kirschner Lake	Bruin Lake	Ursus Lake	Port Dick Lake	English Bay Lakes	Bear Lake	Grouse Lake	
1984	2.110														2.100
1985	2.018														2.018
1986	2.350			0.839	0.500	0.320									4.009
1987	2.022			1.000				0.867			0.705				4.594
1988	2.100	0.783		2.600	1.100	0.552	0.521	0.521			0.222				8.399
1989	2.000	1.000		3.500	1.000	0.500	0.500	0.250			0.430		2.200		11.380
1990	1.750	1.250		3.250	1.000	0.500	0.500	0.250	0.500			0.350	2.400		11.750
1991	2.000	1.300		2.200	0.500	0.250		0.250	0.250			0.241	1.619		8.610
1992	2.000	1.000		2.750	0.500	0.250		0.250	0.250	0.250		0.290	2.370		9.910
1993	2.000	1.000		1.400	0.500	0.250		0.250	0.250	0.250		0.581	1.813		8.294
1994	0	0		0	0	0		0.300	0	0		0.800	0.170	0.570	1.327
1995	1.632	1.061		1.129	0.337	0.251		0.251	0.251	0.252		0	0.360	0.793	6.287
1996	1.490	1.030		0.951	0.500	0		0.250	0.250	0.250		0.155	0.864	0	5.657
1997	2.000	1.000		0				0.250				0.199	0.788	1.966	6.203
1998	2.005	1.302						0.250				0	0.265	1.288	5.610
1999	0.265	0.453						0.173				1.149 <sup>a</sup>	1.380	0	3.420
2000	1.708	1.248						0.248				1.006 <sup>b</sup>	1.794		6.004
2001	0.089	0						0				0	0.145		0.234
2002	2.249	1.280			0.500 <sup>c</sup>			0.302				0	2.407		6.738
2003	2.240	1.547						0.298				0.695	1.801		6.581
2004	2.002	0.351	0.110					0.251				0.050	3.009		5.663
AVG.	1.709	0.913	0.110	1.635	0.536	0.261	0.507	0.289	0.250	0.200	0.452	0.368	1.454	0.691	5.942

<sup>a</sup> Sockeye release at English Bay consisted of 918,000 fry released in Nov. 1999 and 231,000 fry held over winter for release in spring 2000.

<sup>b</sup> Sockeye release at English Bay consisted of 906,000 fry released in summer 2000 and an estimated 100,000 fry held over winter for release in spring 2001.

<sup>c</sup> Experimental fall fry (“pre-smolt”) release.

- continued -

Table 11.-Page 2 of 3.

YEAR	JUVENILE PINK SALMON					JUVENILE CHINOOK SALMON					
	Tutka Bay Hatchery	Halibut Cove Lagoon	Homer Spit	Port Graham Hatchery	TOTAL PINKS	Seldovia Bay	Halibut Cove Lagoon	Homer Early	Spit Late	Resurrection Bay <sup>d</sup>	TOTAL CHINOOK
1984	19.560				19.560			0.080		0.111	0.191
1985	23.500				23.500		0.098	0.152		0.186	0.436
1986	23.100	2.000			25.100		0.101	0.104		0.101	0.306
1987	20.500	3.000	0.295		23.795	0.084	0.094	0.104		0.096	0.378
1988	12.000	3.000	0.300		15.300	0.084	0.094	0.104		0.205	0.487
1989	30.100	6.000	0.332		36.432	0.108	0.115	0.104		0.307	0.634
1990	23.600	6.000	0.303		29.903	0.099	0.112	0.212		0.329	0.752
1991	23.600	6.000	0.303	0.255	30.158	0.091	0.092	0.191		0.466	0.840
1992	23.600	6.000	0.300	1.800	31.700	0.113	0.117	0.226	0.126	0.370	0.952
1993	43.000	6.000		0	49.000	0.107	0.100	0.212	0.100	0.290	0.809
1994	61.000			1.295	62.295	0.106	0.107	0.192	0.157	0.270	0.832
1995	63.000			0.358	63.358	0.113	0.036	0.228	0.124	0.315	0.816
1996	105.000			6.470	111.470	0.109	0.103	0.101	0.121	0.415	0.849
1997	89.000			0.910	89.910	0.092	0.078	0.216	0.105	0.321	0.812
1998	90.000			0	90.000	0.079	0.073	0.137	0.120	0.307	0.716
1999	60.132			4.617	64.749	0.074	0.079	0.163	0.059	0.174	0.549
2000	65.120			1.144	66.264	0.068	0.083	0.220		0.322	0.693
2001	99.336			27.299	126.635	0.103	0.107	0.208		0.228	0.646
2002	100.000			6.604	106.604	0.083	0.106	0.190		0.194	0.573
2003	67.967			57.158	125.125	0.108	0.107	0.206		0.220	0.641
2004	57.844			36.283	94.127	0.089	0.104	0.169		0.214	0.576
AVG.	52.427	4.750	0.306	10.300	61.190	0.095	0.095	0.168	0.114	0.259	0.642

<sup>d</sup> Chinook releases in Resurrection Bay are a cumulative total for all locations.

- continued -

Table 11.-Page 3 of 3.

YEAR	JUVENILE COHO SALMON					
	Caribou Lake	Seldovia Lake	Homer Spit		Resurrection Bay <sup>c</sup>	TOTAL COHO
			Early	Late		
1984					0.341	0.341
1985	0.139	0.083			0.407	0.629
1986	0.138	0.072			0.622	0.832
1987	0.150	0.045			0.604	0.799
1988	0.150	0.045		0.060	0.530	0.785
1989	0.182	0.080		0.143	0.339	0.744
1990	0.180	0.050		0.123	1.126	1.479
1991	0.180	0.050		0.100	0.599	0.929
1992	0.150			0.100	0.265	0.515
1993	0.150			0.116	0.844	1.110
1994	0.064			0.156	0.560	0.780
1995				0.110	0.701	0.811
1996				0.150	0.676	0.826
1997				0.120	0.808	0.928
1998				0.148	0.726	0.874
1999				0.137	1.603	1.740
2000				0.122	0.618	0.740
2001			0.125	0.100	0.431	0.656
2002			0.096	0.121	0.241	0.458
2003			0.223	0.103	0.905	1.231
2004			0.130	0.113	0.742	0.985
AVG.	0.148	0.061	0.144	0.119	0.652	0.866

<sup>c</sup> Coho releases in Resurrection Bay are a cumulative total for all locations.

**Table 12.**-Personal use/subsistence set gillnet salmon catch in numbers of fish by species and effort, Southern District, Lower Cook Inlet, 1969 – 2004<sup>a</sup>.

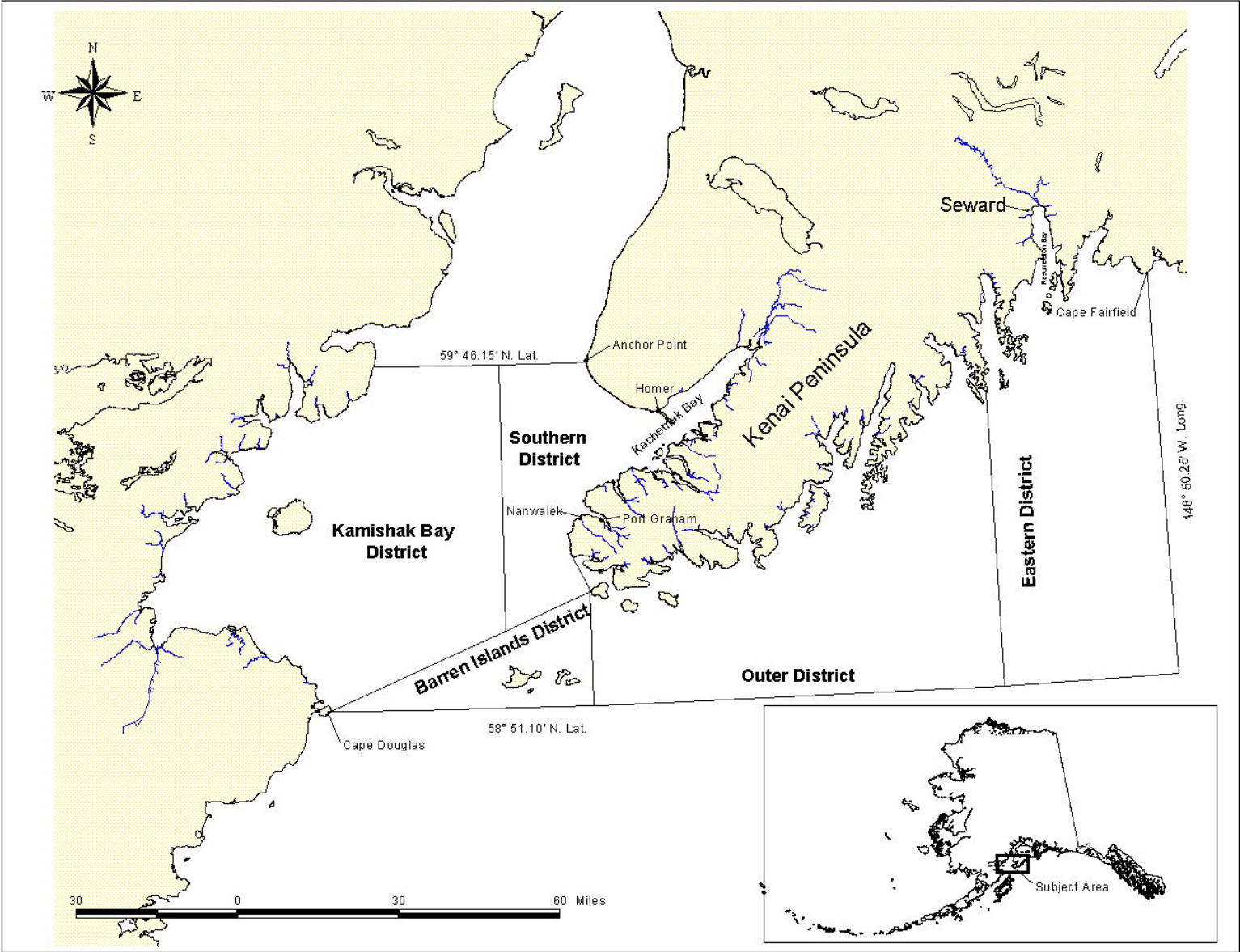
Year	Permits Issued	Permits Returned		Permits Did		Total			Catch			Total
		Number	%	Fish	Fished	Chinook	Sockeye	Coho	Pink	Chum	Other	
1969	47	44	93.6	35	9	0	9	752	38	0	17	816
1970	78	73	93.6	55	18	0	12	1,179	143	13	39	1,386
1971	112	95	84.8	53	42	2	16	1,549	44	7	20	1,638
1972	135	105	77.8	64	41	1	11	975	48	69	19	1,123
1973	143	128	89.5	82	46	0	18	1,304	84	40	9	1,455
1974	148	118	79.7	52	66	0	16	376	43	77	27	539
1975	292	276	94.5	221	55	4	47	1,960	632	61	95	2,799
1976	242	221	91.3	138	83	16	46	1,962	1,513	56	75	3,668
1977	197	179	90.9	137	42	12	46	2,216	639	119	84	3,116
1978	311	264	84.9	151	113	4	35	2,482	595	34	89	3,239
1979	437	401	91.8	238	163	6	37	2,118	2,251	41	130	4,583
1980	533	494	92.7	299	195	43	32	3,491	1,021	25	153 <sup>b</sup>	4,765
1981	384	374	97.4	274	100	25	64	4,314	732	89	100	5,324
1982	395	378	95.7	307	71	39	46	7,303	955	123	8	8,474
1983	360	328	91.1	210	118	4	21	2,525	330	40	2	2,922
1984	390	346	88.7	219	127	4	25	3,666	821	87	25	4,628
1985	316	302	95.6	205	97	5	43	3,372	166	35	3	3,624
1986	338	310	91.7	247	63	7	68	3,831	3,132	56	0	7,094
1987	361	338	93.6	249	89	5	50	3,977	279	61	0	4,372
1988	438	404	92.2	287	117	14	60	4,877	1,422	75	0	6,448
1989	466	452	97.0	332	120	41	156	7,215	882	53	49	8,396
1990	578	543	93.9	420	123	12	200	8,323	1,846	69	0	10,450
1991	472	459	97.2	295	164	8	47	4,931	366	23	0	5,375
1992	365	350	95.9	239	111	5	63	2,277	643	21	0	3,009
1993	326	317	97.2	215	102	6	44	1,992	463	18	0	2,523
1994	286	284	99.3	224	60	66	80	4,097	1,178	18	0	5,439
1995	235	232	98.7	178	54	118	108	2,916	343	7	0	3,492
1996	299	293	98.0	213	80	302	102	3,347	1,022	24	0	4,797
1997	276	264	95.7	185	79	383	191	1,814	252	12	0	2,652
1998	227	214	94.3	142	72	135	20	1,461	167	5	0	1,788
1999	146	141	96.6	111	30	276	119	1,803	168	3	0	2,369
2000	213	206	96.7	151	55	104	28	2,064	304	4	0	2,504
2001	154	148	96.1	112	34	86	27	1,579	150	16	0	1,858
2002	122	113	92.6	93	20	61	33	1,521	251	12	0	1,878
2003	104	96	92.3	72	24	17	57	1,071	170	9	0	1,324
2004 <sup>c</sup>	91	82	90.1	64	18	7	56	1,554	172	16	0	1,805
69-03 Avg.	284	266	93.6	186	79	52	57	2,887	658	41	24	3,719
94-03 Avg.	206	199	96.6	148	51	155	77	2,168	401	11	0	2,811

<sup>a</sup> Figures after 1991 include information from both returned permits and inseason oral reports.

<sup>b</sup> Steelhead trout (*Onchorhynchus mykiss*).

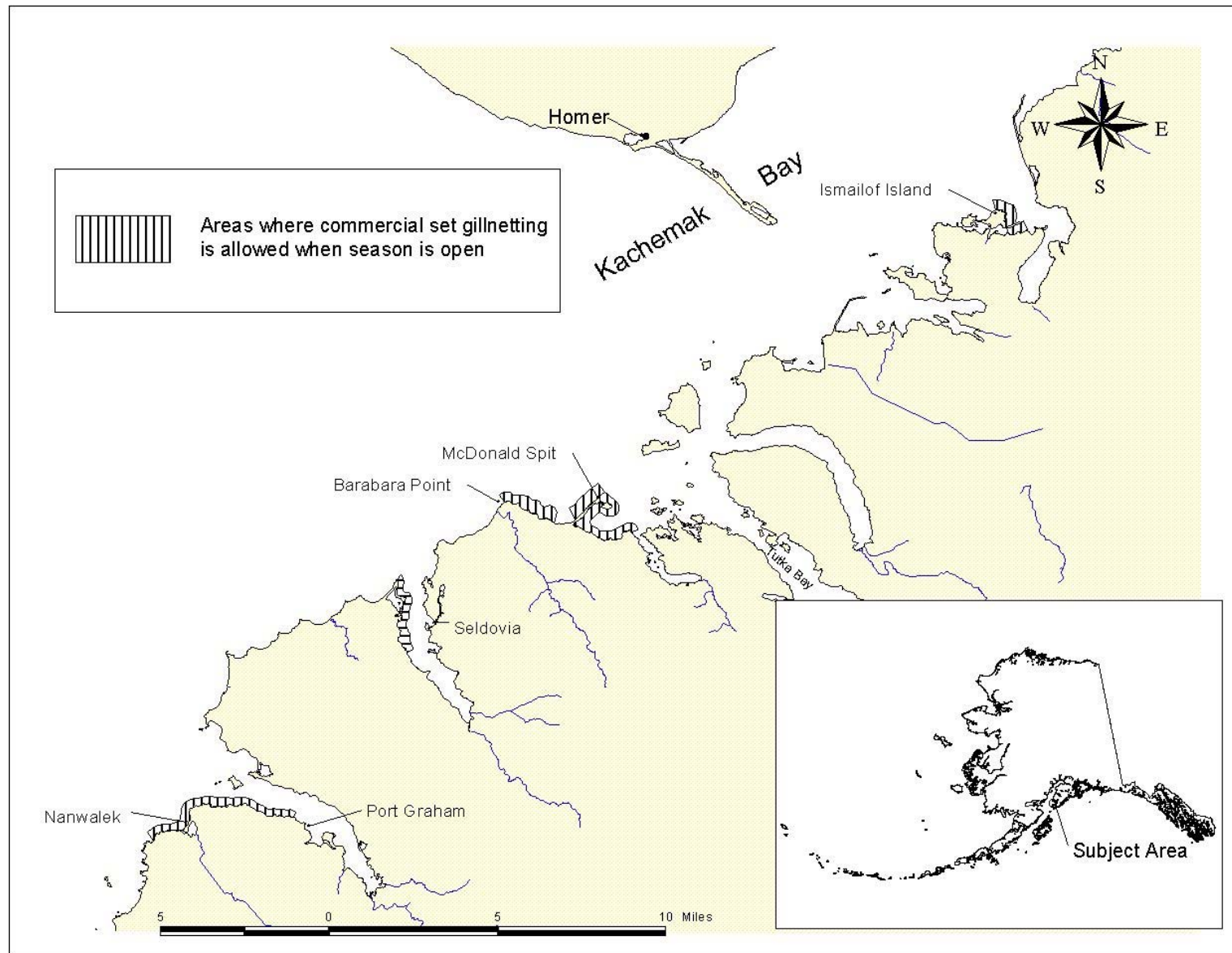
<sup>c</sup> Figures derived from permit returns and oral reports through 9/30/04.

**Figure 1.-Lower Cook Inlet salmon and herring management area.**

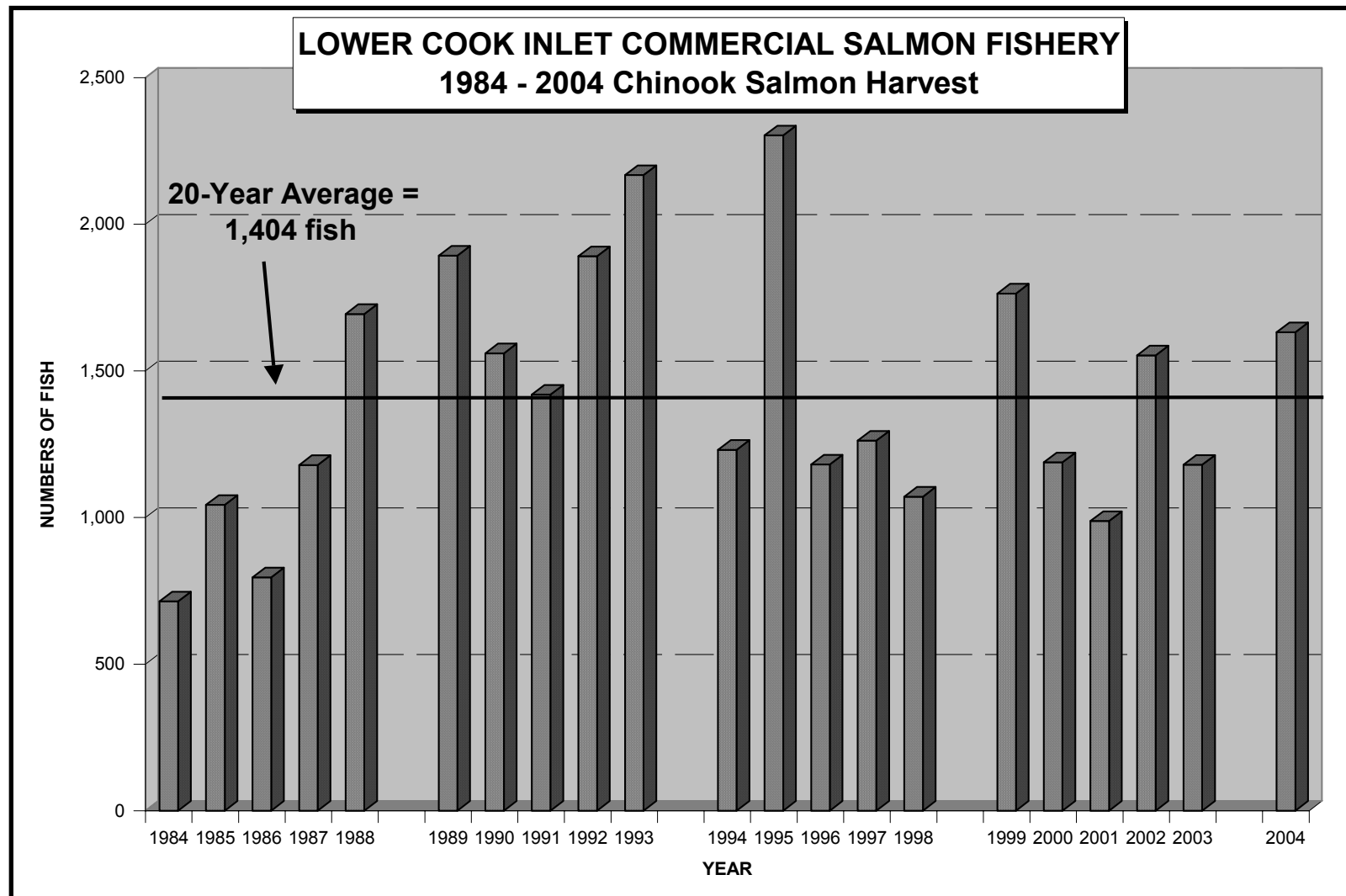




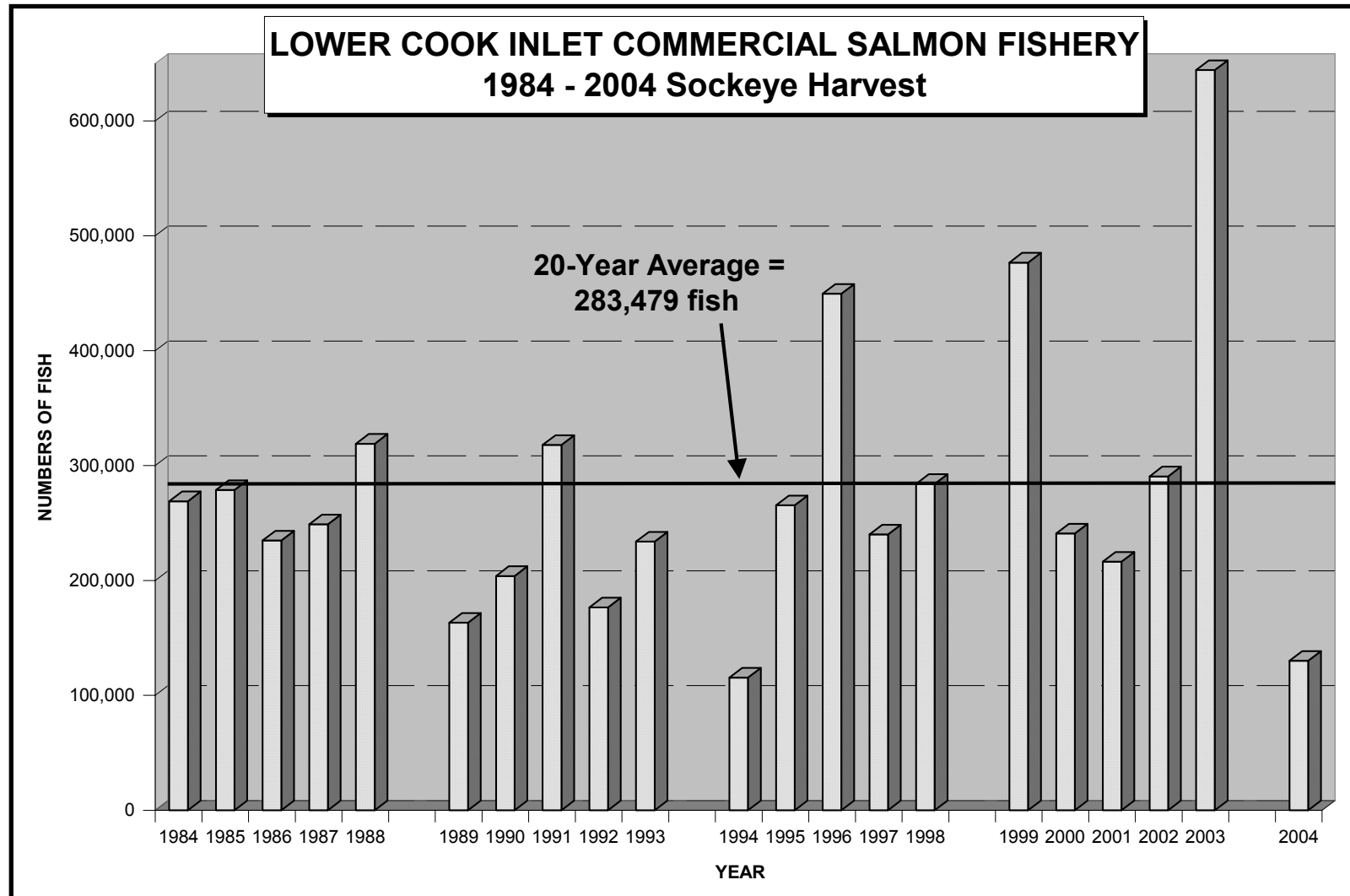
**Figure 2.**-Commercial set gillnet locations in the Southern District of Lower Cook Inlet.



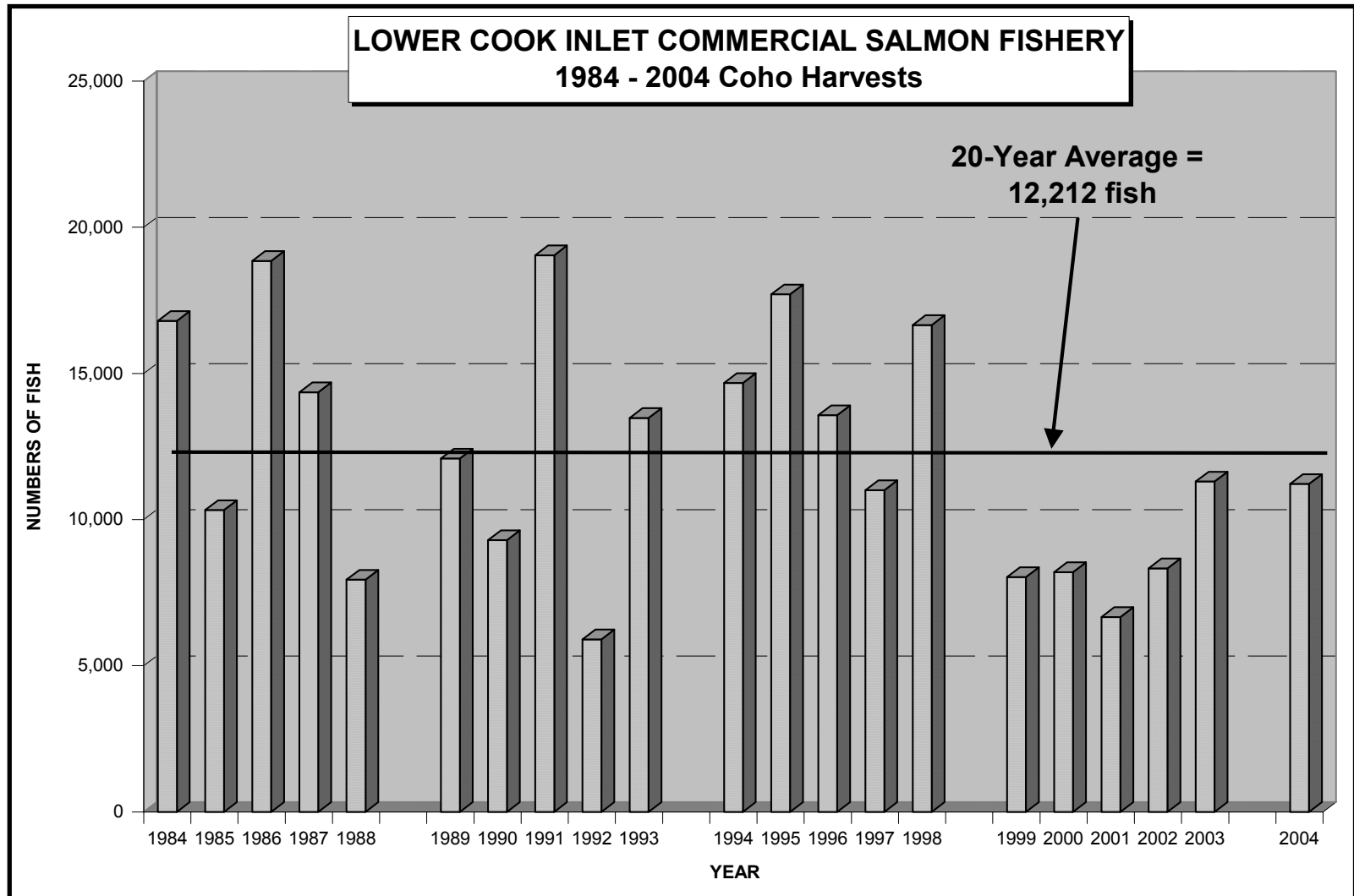
**Figure 3.**-Commercial harvests of Chinook salmon, Lower Cook Inlet, 1984 - 2004.



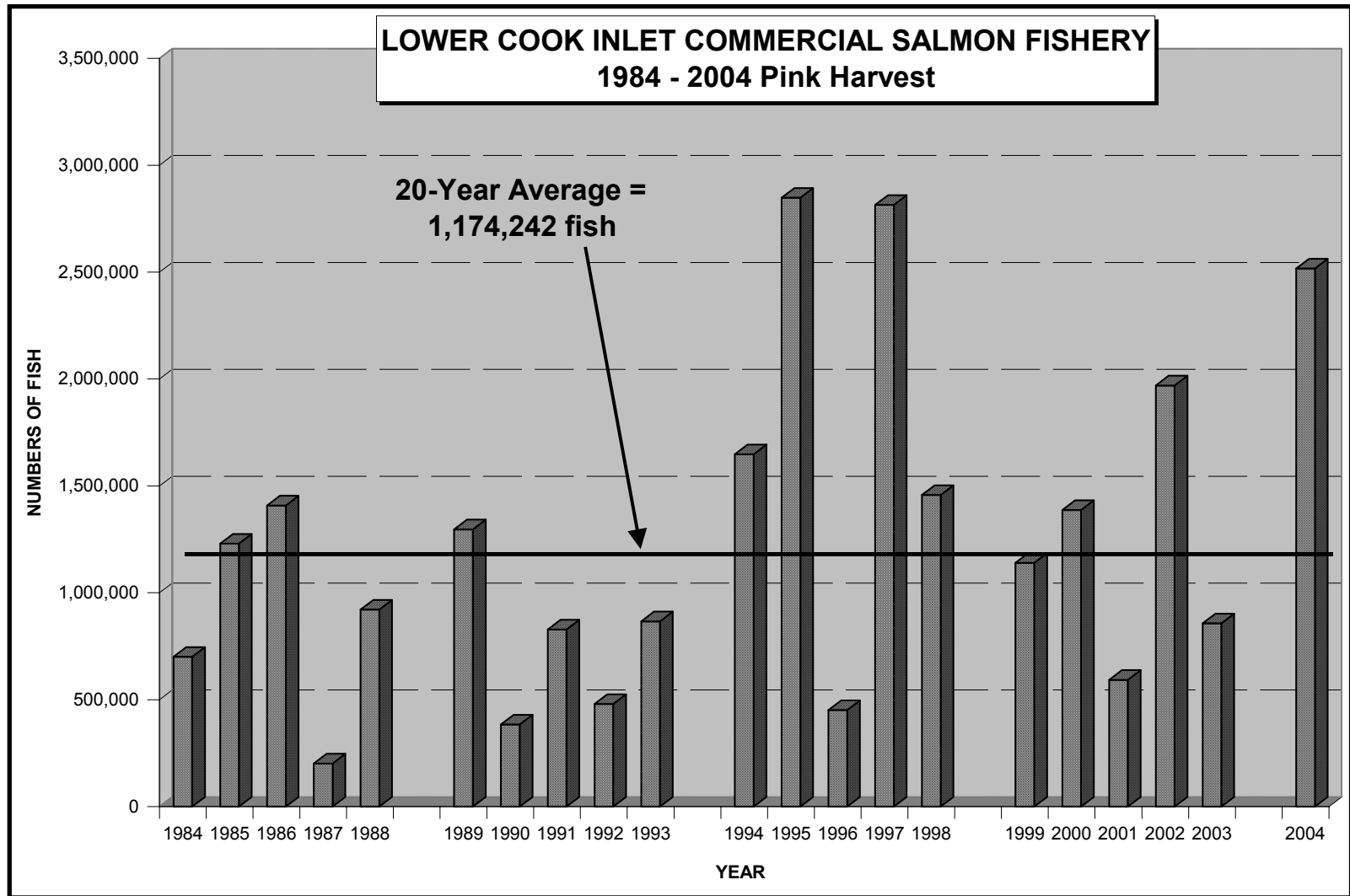
**Figure 4.**-Commercial harvests of sockeye salmon, Lower Cook Inlet, 1984 - 2004.



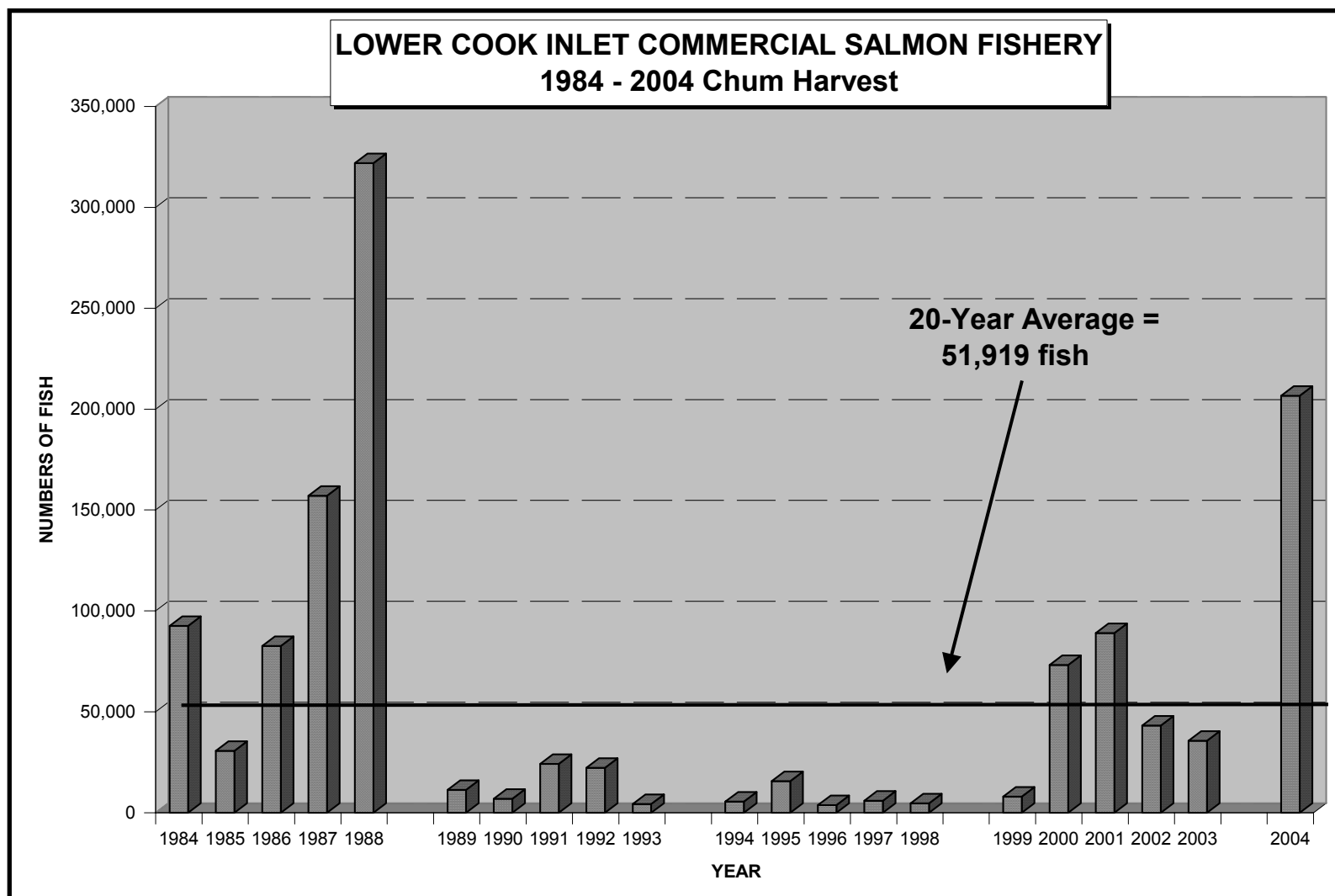
**Figure 5.**-Commercial harvests of coho salmon, Lower Cook Inlet, 1984 - 2004.



**Figure 6.-**Commercial harvests of pink salmon, Lower Cook Inlet, 1984 - 2004.



**Figure 7.-Commercial harvests of chum salmon, Lower Cook Inlet, 1984 - 2004.**



**Figure 8.**-Commercial set gillnet harvests, Lower Cook Inlet, 1984 - 2004.

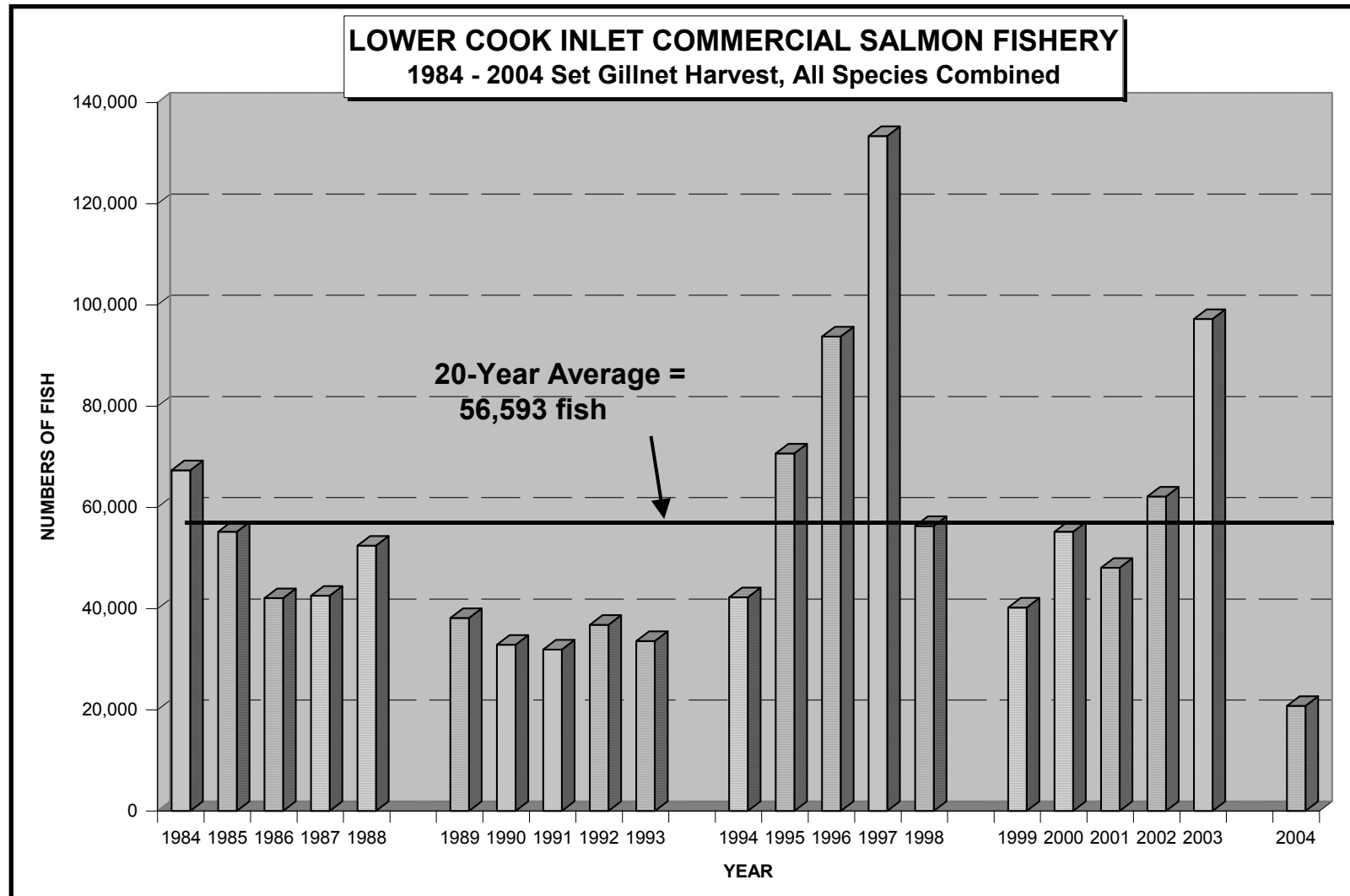
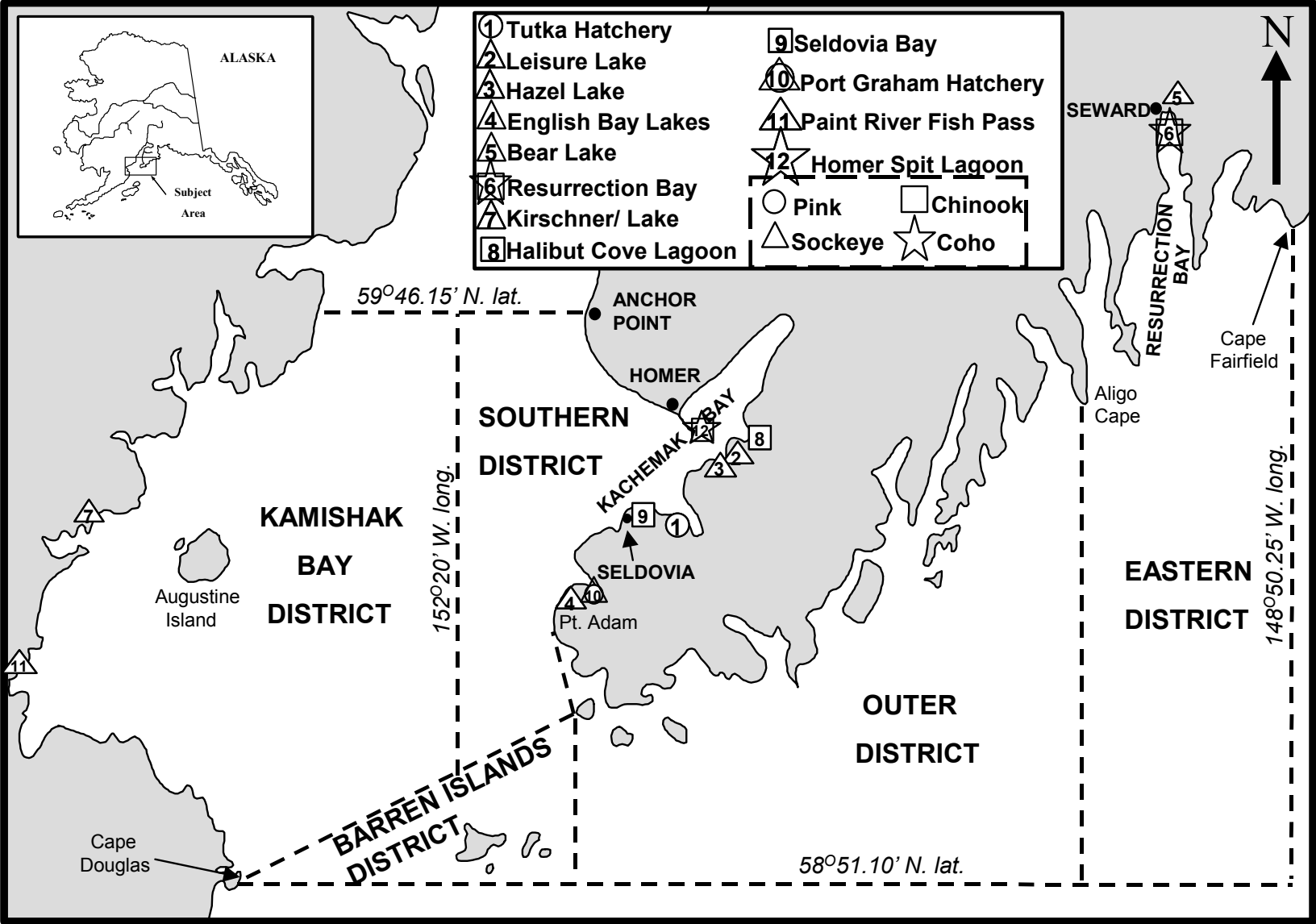


Figure 9.-Salmon hatcheries and enhancement/rehabilitation sites in Lower Cook Inlet, Alaska.





**Figure 10.**-Harvests of coho salmon in the Southern District Coho Salmon Personal Use/Subsistence Set Gillnet Fishery, Lower Cook Inlet, 1991 - 2004.

